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# Canadian Public Health Journal

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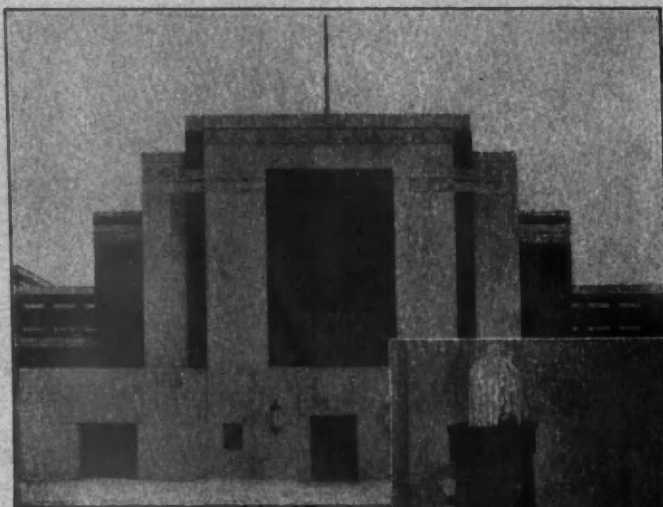
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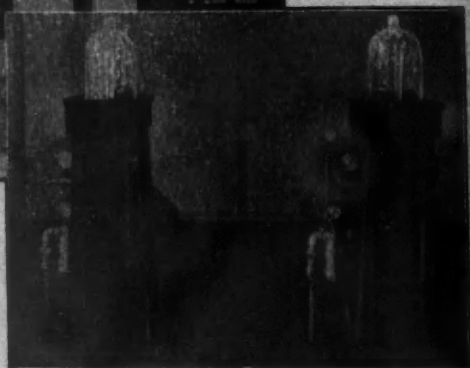
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## The Vancouver Outbreak of Haemorrhagic Smallpox *I.—Epidemiological Study of the Outbreak*

J. W. McINTOSH, B.A., M.D., D.P.H.

*Medical Officer of Health, Vancouver, B.C.*

FAMILIARITY breeds contempt. In Vancouver's recorded smallpox history, out of a total incidence of 2,018 cases, spread over twenty-six of the twenty-seven years, 2,009 were of the benign type. The indifference so engendered, aided and abetted by anti-vaccinationists' propaganda, resulted in a fairly widespread susceptibility of the populace to this disease. An indication of the neglect of vaccination is shown by an estimate made by the School Medical Officer that approximately one-half of the 40,000 public school pupils were unprotected by vaccination. Discovery, therefore, of three mild cases between the 8th and 15th of January, 1932, caused little uneasiness, apart from the fact that many contacts had been made, owing to the nature of the occupations of these first cases. These first cases were thought to be chickenpox. On the 17th, however, the reporting of a case of the severe confluent type, which had been associated with two of the former cases, caused anxiety which developed in a few days into consternation, on the discovery of several more mild cases and two of the haemorrhagic type. These two haemorrhagic cases were diagnosed by physicians as measles. It was realized, therefore, that there had been, by this time, thousands of possible contacts.

The spread of the disease was facilitated by:

- (a) The large percentage of the community unprotected against smallpox by vaccination.
- (b) The mistakes in diagnosis both by the persons affected and a few physicians, owing to unusual factors.
- (c) The nature of the occupations of some of the cases, at large after taking ill.
- (d) Three, four or five possible sources of origin about the same time.
- (e) The intense communicability of the malignant type.

ORIGIN—There were five groups of cases\* in all, contracted certainly from three sources, possibly from five.

#### *Group 1*

The origin of the first eight cases in time, though not in order of discovery, was from Everett, State of Washington. The first case, a woman, and those she infected were at large for six weeks before being located. Seven of the eight cases were mild.

#### *Group 2*

The source of this case was not revealed. It developed too early to have been Group 1, and too late to have caused Group 3, though it and the latter may have had a common unknown origin. It was a mild case in an unvaccinated person.

#### *Group 3*

Though there is no evidence of contact of this group with the first group, it was possible as to time, and both groups lived in about the same section of Vancouver and Burnaby. It comprised certainly 31, probably 33 cases. There were 12 deaths, all but one occurring in unvaccinated persons.

#### *Group 4*

These cases developed from a man who became ill about three days after his arrival in the city from eastern Canada. These all occurred, in time, after the first three groups were under control. There were 12 cases with four deaths.

#### *Group 5*

The case in this group arose from a woman living many miles from Vancouver, whose only possible exposure was in a visit to the state of Washington where there were cases of smallpox, but none of the haemorrhagic variety. She had never been vaccinated, and died. Her husband was vaccinated 50 years previously; he nearly died. Three children were recently vaccinated; none of them took the disease.

The groups are summarized in the following table:—

TABLE I  
CASES AND DEATHS IN GROUPS

Group	Cases	Deaths
1	8	0
2	1	0
3	33	12
4	12	4
5	2	1
Totals . . . . .	56	17

Case—fatality rate . . . . . 30.4

\*Case histories are given in the tables on pages 116-119.

TABLE 1A  
CASES AND DEATHS IN GROUP 3

Group 3 cases	Cases	Deaths
Early cases and contacts.....	8	0
First fatal haemorrhagic case and contacts....	9	7
First fatal confluent case and contacts.....	16	5

All cases in Group 3 (mild and malignant) appeared to have a common source of origin, which source, however, was not proved. Before January 25th, there were eight cases; all recovered except two. Of the 21 cases resulting from exposure to these two, all were malignant except those who had been previously vaccinated; 10 died.

**OCCUPATION OF PATIENTS**—Some of those contracting smallpox exposed others for periods varying from one day to 2½ weeks in the case of a motorman on the railway. To mention the nature of their employment tells the seriousness of the tale:—

One woman at large for 10 days after an attack of what she called "flu".  
 One man operating a delivery truck for a general store.  
 One man operating a delivery truck for a chain store.  
 Two men operating milk delivery vehicles.  
 Two working in a box factory with 70 other employees.  
 One motorman on an electric railway passenger car.  
 One laundry worker.  
 One employee in a beauty parlor.  
 One employee on C.P.R. dock.  
 One manager of branch bank.  
 One school child in a class in which, fortunately, all were vaccinated except two.  
 One regimental officer interviewing serially several hundred men, and attending a regimental dance on a second evening. This case was the origin of the fourth group.

**ERRORS IN DIAGNOSIS**—Owing to unfamiliarity of many physicians with smallpox, especially with the haemorrhagic form, health officers are likely to have difficulties. Examples of our troubles are given here.

*Influenza*—Two cases were so diagnosed; one of these was the first case, who went about for 10 days after her arrival from Everett, Washington, on Christmas day. Her case was not revealed until the 6th of February by working back from two families infected by her. She repeatedly denied, here and to the health officer in Everett, having had a rash at all, until confronted in the presence of her mother. Chickenpox was the diagnosis made in eight cases. Two of these errors were made by physicians, one of whom contracted smallpox as a consequence.

*Measles*—Three cases. Two of these were diagnosed as haemorrhagic measles by physicians, and one as ordinary measles by a Christian Science practitioner. Measles had been epidemic. The prodromal lobster variety of rash may resemble measles very closely. Concerning the first of these cases an undertaker telephoned the medical health officer stating that a certificate of death from haemorrhagic measles had been given by a reputable physician. This was reported to our epidemiologist, who on inquiry was satisfied to allow the burial to proceed.

This was before we had had any haemorrhagic smallpox. Later, the attending physician corrected the diagnosis with the approval of our epidemiologist, at the instance of an interested insurance company, because deceased, as a conscientious objector to vaccination, had signed a waiver in case of death from smallpox. This man's whole family, except three children who had been vaccinated, died of haemorrhagic smallpox.

*Myelitis and haemorrhage of the brain* probably as a result of vaccination was a diagnosis of one physician in the case of a woman whom he had vaccinated some four days before she became ill. The first word the medical health officer had of this case was from a newspaper reporter who had been informed by the physician himself. He persisted in this diagnosis in spite of the opinions expressed by a nurse, a nursing-sister and the attending physician at the hospital, also a pathologist who refused to do an autopsy, as his diagnosis was smallpox. We got a permit from the coroner to hold an autopsy. No myelitis, encephalitis, nor haemorrhage of the brain was found, and the diagnosis of smallpox was corroborated. Besides, a practical nurse who attended this case contracted smallpox; in citing the contacts of the case the physician had not given her name, nor had he warned her to be vaccinated. We just happened to hear about her and vaccinated her before she became ill, but too late to avert the disease.

*Cholecystitis*—A woman entered the hospital under this diagnosis. On entry her husband signed a paper refusing vaccination to his wife. After a time in hospital exceeding the incubation period of smallpox, she suddenly became ill. A diagnosis of an acute exacerbation of cholecystitis led to a gall bladder operation. The illness was haemorrhagic smallpox, of which she died.

*Chicken-pox*—In several cases the differential diagnosis of chicken-pox or smallpox was in doubt for a few days. To settle a difference of opinion in one case as to chicken-pox, an unsuccessful vaccination was a factor in confirming the diagnosis of smallpox. One case of smallpox, apparently on information or advice given professionally that the disease had been chicken-pox, was deliberately vaccinated in order, in the event of a "take", to sue the city for damages consequent on a false diagnosis and quarantine restriction. The vaccination was unsuccessful.

These points of information are given to show the difficulties that may arise in the face of serious contagious disease, with deaths, in a community.

#### VACCINATION HISTORY OF PATIENTS

It is worthy of note that of a total of 56 cases, 40 had never been vaccinated before infection and 16 had been vaccinated more than 15 years before. There was not one case of smallpox in a person who had been vaccinated within 15 years.

TABLE II  
VACCINATION HISTORY

Type of Disease	Vaccinated				Totals
	Never	Over 15 years previously	Under 15 years before	After infected	
<i>Discrete</i>					
Mild before malignant type appeared	10	2	..	..	12
Mild after malignant type appeared	1	8	..	5	14
Moderate severity	..	1	..	..	1
Severe	3	..	..	2	5
<i>Confluent</i>	2	4	..	3	9
<i>Haemorrhagic</i>	12	1 (36 yrs.)	..	2	15
Total cases	28	16	..	12	56
Total deaths	16	1	..	..	17

Of the 17 who died, 16 had never been vaccinated; the 17th had been vaccinated 36 years previously. Of the cases never vaccinated, 53 per cent died. Of those cases vaccinated over 15 years before, 1 out of 16 died, or 6 per cent.

#### DOES VACCINATION PROTECT AGAINST SMALLPOX?

Everyone actively connected with this epidemic does not think, but knows, that vaccination is an absolute necessity as a protection. This experience in Vancouver, summarized in Table II, leaves no doubt whatever of the efficacy of vaccination. Some striking demonstrations of its value are shown in the following examples:—

1. Family S.—Conscientious objectors to vaccination—father, his brother, wife, three children and the fiancé of one of the girls, never vaccinated—all contracted smallpox and died—seven persons. Three other children, vaccinated in school some years before, did not even take the disease, though all lived in the same house.

2. Family D.—Three children unvaccinated contracted smallpox—father and mother, vaccinated, did not.

3. Unvaccinated child in school class; all in the class vaccinated but two; no further cases.

4. Family in the country—the mother, never vaccinated, contracted smallpox and died, after exposing her husband and three children. Her husband, said to have been vaccinated 50 years before, contracted the disease and nearly died. The three children were vaccinated, and did not take smallpox.

5. Man, at mining camp, exposed in Vancouver, vaccinated as a child, contracted smallpox and recovered. His wife contracted it from him. She had never been vaccinated and died. Another woman contact who had been vaccinated as a child contracted the disease in a mild form.

6. Father, mother and 2 children equally exposed—father and one child, never vaccinated, contracted smallpox; mother and other child, vaccinated, escaped.

7. The whole hospital staff was re-vaccinated. Not one contracted smallpox.

#### CONTROL MEASURES

*Reporting*.—Pressure was brought to bear on all to report any rashes or illness of any doubtful nature to the health department.

*Quarantine*.—Rigid isolation of all cases at home or in hospital was practised, as was strict quarantine of contacts, except, in the latter, when proof was produced of recent vaccination.

*Vaccination*.—All contacts who were found or traced out were vaccinated. A wide vaccination campaign was carried out. Vaccine was supplied to all physicians, who vaccinated about 50,000 persons. The health department advertised, supplied all vaccine free, operated school clinics where 10,901 were vaccinated in four days, and conducted public clinics daily, where 6,600 were vaccinated. The department vaccinated, also, about 2,000 contacts and all city employees. In all, between 90,000 and 100,000 persons in the province were vaccinated.

*Publicity*.—Half-page advertisements, urging vaccination, were inserted on two occasions in the three daily papers, which were also kept informed of the situation daily. The advertising was done jointly by the Greater Vancouver Health League and the city health department.

*Port Authorities* and other bodies, domestic and foreign and consuls, were kept informed of the situation. The U.S. Consular Service was daily advised that the outbreak was under control. There was consequently no interference with the port, or with the border traffic.

*Anti-vaccinationist propaganda*.—This consisted of:

- (a) Printed dodgers distributed on the street containing anti-vaccination statements extending to the most weird and fantastic.
- (b) Press articles and paid anti-vaccinationist advertisements. Some of these requested those who had had any trouble with their vaccination to report to their office. No material was forthcoming.
- (c) Public meetings of protest against vaccination.
- (d) Public debate at which two public health officers took part. The city medical health officer refused the invitation, holding that it was not a debatable question. In lieu of this, he issued an invitation for vaccination objectors, who were not vaccinated, to visit the smallpox wards with him, and inside of two weeks they would know whether or not vaccination protected against smallpox. There were *no takers* of this offer.



## MILD AND MALIGNANT FORMS OF SMALLPOX

Since the question as to whether the mild form ever develops into the malignant has given rise to much dispute, only facts will be noted here in order to put medical officers of health on their guard, so that they will not look complacently upon the mild form, feeling that the malignant type is very far away and that it will probably give ample warning of its approach.

Such an attitude is based on the hypothesis that the virus of malignant smallpox causes always malignant smallpox, except in a vaccinated person, who, if he is not wholly protected, is partially so, and the disease in him will be milder; if, however, he passes it on to an unvaccinated person, the type will run true to form and be malignant; on the other hand, according to this hypothesis, the virus of mild smallpox passed from one to another remains of the mild type, whether in vaccinated or unvaccinated persons.

The natural reaction to this is to look with more or less condescension on the mild form. This may and does tend towards laxity on the part of public health officials, and to neglect of vaccination on the part of the public.

In Vancouver, of the 5 groups, Nos. 1 and 2 contained only mild cases. Groups 4 and 5 conform to the hypothesis so far as our cases are concerned, namely, all were malignant save and except in those previously vaccinated. The cases of group 3 were all of the same social set, who had freely intermingled, and would appear to have had a common source. If the original case was an overlooked mild case in a vaccinated person who had been exposed to a malignant type abroad, what should have happened and what did happen may be shown thus:—

Serial No.	Date of onset	State as to vaccination	Type of case to be expected	Actual result	Actual: Expected
4	Jan. 8	Never	Malignant	Mild	At variance
5	" 8	Years ago	Mild	Mild	As expected
6	" 12	Never	Malignant	Confluent Died	As expected
8	" 12	Never	Malignant	Haemorrhagic Died	As expected
10	" 16	Years ago	Mild	Confluent Recovered	At variance

Of the five, three held true, two did not.

To us, this is evidence that the hypothesis is not supported by the sequence of events in the third group. To support this hypothesis one would have to suppose that someone, previously vaccinated but not completely protected, was, say, in Shanghai during a smallpox outbreak in November, that he was exposed there, contracted the infection and immediately shipped for Vancouver, that the incubation period was prolonged to outlast the voyage and terminal inspection, that the disease

developed after arrival in Vancouver, that the attack was mild, that he escaped observation, that he infected others in the southeast suburban part of Vancouver, that they developed the disease in both mild and malignant forms in both vaccinated and unvaccinated persons (at variance with the hypothesis); and that someone in Mexico repeated the same performance, happening only to infect vaccinated persons in Washington (as a matter of report, chiefly unvaccinated persons developed the disease there, and all cases were mild); and, similarly, the infection travelled from Mexico to eastern Canada, that there a mild case in a formerly vaccinated person infected a vaccinated person heading for Vancouver, that again the same thing happened to the woman living outside Vancouver, going to Washington; so that from at least three points, perhaps five, these sources of infection all happened to head for Vancouver. This taxes one's credulity, and if the hypothesis that like invariably breeds like, in reference to mild and malignant smallpox, be accepted, the experience of other places at other times must be similarly dismissed, and recent observations of laboratory workers developing occasionally mild viruses into malignant must be set aside. From the trying experience in Vancouver, it seems but fair for us to conclude that malignant smallpox can arise from the mild type. It is admittedly difficult to get the complete information under all circumstances, but certainly the facts as we have them in Vancouver support that hypothesis more readily than they support the former hypothesis.

Under these considerations it will be well for the medical officer of health, even if he believes that malignant can only develop from malignant, to treat a case, an outbreak or an epidemic of the mild form of smallpox as seriously as if it were of the malignant type.

## *II.—Lessons Learned from the Outbreak*

J. W. McINTOSH, B.A., M.D., D.P.H.

(1) Malignant smallpox is a horrible, filthy disease, foul-smelling, painful and excessively infectious, with two-thirds of the cases resulting fatally and gross disfigurement of those who survive. There were fifteen haemorrhagic cases and every case resulted fatally—mortality, 100 per cent; of the confluent cases, 11 per cent died. Of the confluent and haemorrhagic cases together, 66.7 per cent died.

(2) The communicability of the haemorrhagic type is so very great that it is difficult to prevent its spread. By absolutely rigid technique, however, haemorrhagic smallpox can be safely cared for in the same hospital building with other patients without its spread. Isolation of all those in attendance, together, of course, with the vaccination of all patients and members of the staff, is essential. The following notice was sent to the medical superintendent of the hospital:

"From this time until further notice, no unvaccinated person will be admitted to the hospital for treatment, except in dire necessity."

(3) *Indifference to smallpox.*—"There is little chance of my getting smallpox, and, if I do, it does not amount to much, anyway." This expresses the attitude of many citizens. Vancouver's twenty-six years' recorded experience of mild smallpox was no guarantee that the malignant type might not at any time appear. There is sufficient evidence from this experience and from laboratory experiments in other maladies to justify being on guard against the appearance of the malignant type in the presence of mild cases.

(4) Except in those vaccinated, malignant smallpox always produces the malignant type. This held true in this outbreak.

(5) The hypothesis, "once mild in the unvaccinated, always mild in transmission", appears to require further consideration in the light of our experience, though any conditions causing such changes are unknown. One outbreak of smallpox in a community may have more than one source. We had three definitely, possibly five—one from eastern Canada and two or more from the United States.

(6) *Indifference to vaccination.*—"Vaccination is a nuisance for which there is no need." "It will be time enough, should severe smallpox appear." According to some authorities, "vaccination is dangerous", and, according to others, "it will not prevent the disease". This latter attitude was strengthened by the occurrence of post-vaccinal nervous disease in Belgium, Great Britain and elsewhere. Anti-vaccinationists are very active in Vancouver. They are responsible for quite a section of the community being unvaccinated. Further, some health officials had recommended everyone to be vaccinated, but felt that objectors could be neglected on the ground that if smallpox came, it would be of the mild type and would not kill. As a result, a large percentage of the community was insufficiently protected against the disease. Wide-spread vaccination of the community, approaching 100 per cent, is the only safeguard from smallpox of whatever type. It is essential thereafter to vaccinate all children under one year of age, revaccinating before leaving school. In the presence of an epidemic, as a minimum provision, vaccination of all contacts and all who have not been vaccinated within fifteen years is essential. Those whose occupation brings special exposure—namely, physicians, nurses, undertakers, hairdressers, laundry workers, hospital employees, etc.—should be vaccinated from time to time.

In the presence of deaths, the old universal dread of smallpox revives, making vaccination much easier of accomplishment. Public meetings, with lantern slides and photographs of actual cases, were very effective in securing the public's assistance in the control of the outbreak. Large corporations and employers of labour rendered very

great assistance in the vaccination campaign. Vaccination clinics held in all the schools were open to everyone. Public clinics were held in the afternoons and evenings and mass clinics in large public and industrial establishments. The Press is of the greatest value in a campaign for vaccination.

(7) Smallpox vaccine, giving no untoward results after being used in from ninety to one hundred thousand people, needs no other testimony as to its purity and strength. Except for an early emergency, it was supplied by the Connaught Laboratories.

(8) Vaccination is the only effective means for the control of smallpox. There was not one case of smallpox in a person who had been vaccinated within fifteen years. Of the 17 who died, 16 had never been vaccinated, while the 17th had been vaccinated thirty-six years previous. Of the cases never vaccinated, 53 per cent died. Of the cases vaccinated over fifteen years before, one out of 16 died.

(9) The reporting of all diseases with rash and all illnesses of a doubtful nature is essential. The Department must be astute and diligent in finding and following with vaccination or quarantine all contacts of cases.

(10) Difficulties in diagnosis are real. The first haemorrhagic smallpox death was recorded as haemorrhagic measles. The next and indirect report was a death suspected to be from smallpox but proved, on investigation, to be from measles. The third case of smallpox had an initial diagnosis of measles, which was epidemic at the time.

(11) *Treatment*

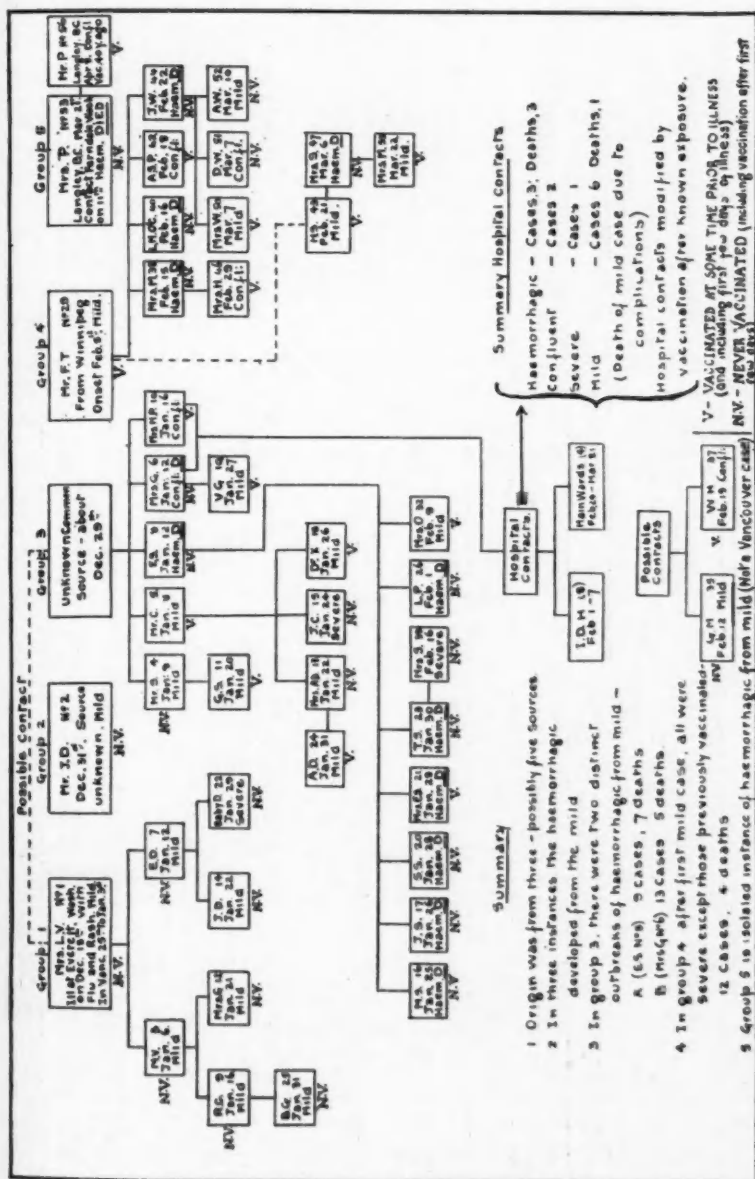
(a) Vaccination of all contacts. Some vaccinated after exposure to the malignant type contracted a milder form of the disease.

(b) Human convalescent blood was used in two cases. It appeared to have a pronounced beneficial effect in one case that in all probability would have died. Its late use in a second case did not prevent a fatal result. We feel that the treatment is worth further trial.

(c) An apparently hopeless confluent case recovered. Treatment by dipping into a tepid bichloride bath, after the appearance of pustules, was certainly considered a factor in his recovery, by reducing the toxæmia and producing a feeling of comfort.

(12) *Financial*.—The cost of the outbreak, in addition to hospital outlay and additional help for the public clinics, was confined to providing the vaccine for all, the doctors making their own charge privately for treatment.

In the experience of some other cities afflicted with an epidemic of haemorrhagic smallpox, the greatest cost has been the enormous losses incident to more or less complete closure from outside points. For Vancouver this meant the closure of the port and a ban on travel across the United States border. This was averted by keeping the foreign consuls and port authorities constantly informed, showing that the situation was in hand.



EPIDEMIOLOGICAL CHART, VANCOUVER EPIDEMIC

**SMALLPOX—VANCOUVER—1832**  
CASES IN ORDER OF ONSET

No.	Initials	Sex and Age	Occupation	Onset	Source	Diagnosis	Vaccination	Type	Outcome	Remarks
1	L.V.	F. 31	Housewife	Dec. 16	Everett, Wash., U.S.A.	Influenza. No Dr.	Never	D. (M.)	R.	Ill in Everett; Vancouver Dec. 25 with rash, at brother's many contacts; returned Jan. 3 to Everett. Rep. Feb. 6.
2	J.D.	M. 21	Clerk	Dec. 31	Untraced	Smallpox by Dr.	Never	D. (M.)	R.	Only time out of Vancouver. Dec. 21 to Burnaby Hall. Rash Jan. 4, rep. Jan. 8.
3	M.V.	F. 6	School	Jan. 6	Daughter No. 1 Contact Dec. 25	Varicella	Never	D. (M.)	R.	With uncle (No. 9); rash Jan. 11. Rep. Feb. 6.
4	S.	M. 32	Delivery Dept. Store	Jan. 8	Uncertain; with man from U.S.A.	Varicella by Dr.	Never	D. (M.)	R.	Friend of No. 5; had same possible contact Dec. 28. Rep. Jan. 18.
5	C.	M. 35	Delivery Milk Co.	Jan. 8	Ditto	Ditto	In youth in War	D. (M.)	R.	Friend of No. 4; had same possible contact.
6	G.	F. 37	Laundry worker	Jan. 12	Friend No. 4 and No. 5	Smallpox by Dr.	Never Objector	C.	D.	In laundry till 13th; close friend of No. 9 and family; 1st malignant type. Rep. Jan. 17.
*7	E.D.	F. 10	School	Jan. 12	Aunt No. 1	Varicella No Dr.	Never	D. (M.)	R.	Visited grandmother (No. 12) while aunt (No. 1) was there; returned Burnaby Jan. 3. Father and mother vaccinated, did not get smallpox; brother and sister did. Rash 12th
8	E.S.	M. 39	Printer Box Co.	Jan. 12	Close friend Nos. 5 and 6	Haem. measles by Dr.	Never	H.	D.	Dr. gave death certificate of measles Jan. 19, and death certificate to smallpox. First Sutherland death—7 of family died. Rep. Jan. 26.
9	B.G.	M. 16	Delivery Chain Store	Jan. 16	Brother No. 1 Uncle No. 3	Varicella No Dr.	Never	D. (M.)	R.	On delivery job while infective. Rash on 8th. Rep. Feb. 6.
10	M.P.	F. 49	Beauty parlor	Jan. 16	Friend No. 5 Common source	Smallpox by Dr.	48 years ago & 41 years ago	C.	R.	Conf. on face. Rep. Jan. 20.
11	G.S.	F. 7	School	Jan. 20	Father No. 4	Ditto	Never till after infection	D. (M.)	R.	
12	G.	F. 48	Housewife	Jan. 21	Niece No. 3	Varicella No Dr.	Never	D. (M.)	R.	Rash Jan. 24. Rep. Feb. 6.
13	A.D.	F. 26	Housewife	Jan. 22	Contact No. 5	Smallpox by Dr.	Never	D. (M.)	R.	Rep. Jan. 28.
14	J.D.	M. 8	School	Jan. 22	Sister No. 7	Varicella No Dr.	Never	D. (M.)	R.	

R.—recovered  
D.—Died.

Type..... D.—discrete (mild, medium, severe)  
C.—confluent  
H.—hemorrhagic.



No.	Initials	Sex and Age	Occupation	Onset	Source	Diagnosis	Vaccination	Type	Outcome	Remarks
15	J.C.	M. 6	School	Jan. 24	Father No. 5	Smallpox by	Never till 7 dys. after contact	(D. (S.))	R.	Rep. Jan. 23.
16	M.S.	F. 7	School	Jan. 25	Father No. 8	Haemorrhagic measles by Dr. Consult. Smallpox	Never; Mother objector	H.	D.	2nd Sutherland death—whole family died except three vaccinated children who did not contract smallpox. Rep. Jan. 28.
17	I.S.	F. 9	School	Jan. 26	Father No. 8	Smallpox	Never	H.	D.	Conf. with intra-pockal haemorrhages. 3rd Sutherland death. Rep. Jan. 28.
18	'X'	M. 45	Physician	Jan. 26	Attended No. 5 and No. 15	Flu, then smallpox	Childhood	D. (M.)	R.	Contact of No. 5 on Jan. 15; unsuccessful vaccination 1909. Rep. Jan. 29.
19	V.G.	F. 12	School	Jan. 27	Mother No. 6	Smallpox	Never till mother taken to hospital	D. (M.)	R.	Vaccinated 15 days before onset; mother never vaccinated, died. Rep. Feb. 1.
20	S.S.	F. 4	At home	Jan. 28	Father No. 8	Smallpox	Never	H.	D.	On Feb. 7 intra-pockal haem., conf. 4th Sutherland death. Rash Jan. 30.
21	E.S.	F. 37	Housewife	Jan. 28	Husband No. 8	Smallpox	36 yrs. ago	H.	D.	On Feb. 7 intra-pockal haem., conf. 6th Sutherland death. Objector to vacc.
*22	D.	F. 1	At home	Jan. 29	Sister No. 7	Smallpox by Dr. Feb. 4	Never	D. (S.)	R.	3rd of family; early cases now revealed to Health Dept. Rep. Feb. 4.
23	T.S.	M. 34	Foreman Box Co.	Jan. 30	Brother No. 8	Smallpox	Never; obj.	H.	D.	6th Sutherland death; while ill exposed 70 employees. Rep. Feb. 3.
24	A.D.	M. 29	Driver milk wagon	Jan. 31	Same as wife	Smallpox	Years ago and on wife's entry hosp.	D. (M.)	R.	Rep. Feb. 3.
25	B.G.	M. 29	Motorman	Jan. 31	Brother No. 9	Varicella No Dr.	Never	D. (M.)	R.	At work with rash. Rep. Feb. 6.
26	L.P.	M. 21	Unemployed	Feb. 1	Sutherlands	Smallpox	Never	H.	D.	Fiance Sutherland and girl; death No. 7. Conf. with intrapock. haem. Rep. Feb. 4.
27	B.B.	F. 3	At home	Feb. 1	Inf. in hosp.	Smallpox	Never	C.	R.	Isolation Dept. Hospital No. 1; a few intra-pock haem., immune blood injections used.
28	J.R.	M. 51	Carpenter	Feb.	Inf. in hospital	Smallpox	Childhood and revaccinated	D. (M.)	R.	I.D.H. No. 2; discharged from hosp. Revaccinated Feb. 6; rep. Feb. 6.
29	F.T.	M. 42	Manager	Feb. 5	Winnipeg	Smallpox by Dr.—late	Childhood	D. (M.)	R.	Three or 4 days after arrival in Vancouver. Exposed 72nd regiment and many others. Rep. Feb. 10.
30	G.A.	M. 40	Electrician	Feb. 7	Inf. in hospital	Smallpox	Never; obj.	H.	D.	I.D.H. No. 3. Conf. with intra-pockal haem. Left hospital, under observation. Rep. Feb. 11.



No.	Initials	Sex and Age	Occupation	Onset	Source	Diagnosis	Vaccination	Type	Outcome	Remarks
45	A.S.	F. 64	Housewife	Feb. 24	Inf. in hospital	Smallpox; held as varicella suspect	90 years ago	D. (Med.)	R.	Vaccination test for diagnosis from varicella, no take. Source possibly cross-infection from I.D.H. V.G.H. No. 1. Diagnosis deferred.
46	F.H.	F. 49	Practical nurse	Feb. 29	Nursed No. 38	Smallpox by Health Dept.	45 years ago and after infection	C.	R.	Was not warned by No. 38 Dr. or nurse to be vaccinated. Dept. not informed of contact. Vacc. and quar. until onset, then taken to hosp. unconscious from hysteria. Some small intra-pock haem. Rep. Mar. 1.
*47	H.S.	F. 34	Housewife	Mar. 6	Husband at Britannia	Smallpox by Dr.	Never till five days after exposure.	H.	D.	Vaccinated 9 days before outbreak. No take. Died March 17.
48	R.C.	M. 40	Logger	Mar. 6	Inf. in hospital	Smallpox	In army 1915 and after infected	D. (Med.)	R.	Probably indirect infection from No. 45. V.G.H. No. 2. Vaccination successful.
49	F.D.	M. 28	Unemployed	Mar. 7	Ditto	Smallpox	Never till after infected; obj.	C.	R.	Nearly died. Probably indirect infection from No. 45 at same time as No. 48. V.G.H. No. 3.
50	A.H.W.	F. 39	Housewife	Mar. 7	Son No. 44	Smallpox	30 years ago and after contact	D. (M.)	R.	Vaccinated 11 days after infection though G.S. objected. Held in quar. after removal of S. from hospital. Husband vaccinated and revaccinated. O.K. Rep. March 12.
51	D.W.	F. 14	School	Mar. 7	Brother No. 44	Smallpox	Never till after infected; successful	C.S.	R.	Vaccinated 11 days after infection; nearly died; some small haem. in some vesicles. Rep. March 12.
52	A.W.	F. 7	School	Mar. 10	Brother No. 44	Smallpox	Never till after infected; good take	D. (Med.)	R.	Vaccinated 8 days after infection. Mild. March 12.
53	P.	F. 53	Housewife	Mar. 21	Wash., U.S.A.	Smallpox by Dr.	Never	H.	D.	Possible contact in Washington State on March 6. Unsuccessful vaccination as mild contacts vaccinated except No. 56. Son vaccinated and had no instance of mild developing into malignant.
54	S.	F. 30	Housewife	Mar. 21	Inf. in hospital	Smallpox	Never	H.	D.	Vaccination refused by husband in writing on day of onset of smallpox. Gall bladder operation Had poortia.
55	M.	F. 52	Housewife	Mar. 22	Probably indirect from No. 43 and No. 47	Smallpox. No Dr. till April 2	52 years ago and 1 week before onset	D. (Med.)	R.	Went to Britannia to bring down body of No. 47 on March 18. Son was down about time of her infection. Son vaccinated, probably indirect infection.
56	P.	M. 58	Farmer	Apr. 8	Wife No. 53	Smallpox by Dr.	40 years ago. Recd. re-vaccination	C.	R.	Intra-pock haem. When wife took smallpox, vaccinated and husband took smallpox, others did not. Very seriously ill.

\*Burnaby.

Britannia Mines.

†Langley.

### III.—Clinical Notes

E. D. CARDER, M.D.

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The disease was very virulent. Fifty-six cases occurred, with seventeen deaths—a case fatality rate of 30 per 100. All ages were represented—the youngest, one year, and the oldest, sixty-five years. Male and female patients were equal in numbers: twenty-eight of each. Forty were unvaccinated, while sixteen had been vaccinated at some time previous to exposure. Of those previously vaccinated, however, not one had been successfully vaccinated within seventeen years. Several were vaccinated after known exposure, but those vaccinated later than four days after such exposure were not fully protected and in a considerable number a typical vaccination and the development of the smallpox rash proceeded simultaneously, without apparent modification.

#### INCUBATION PERIOD

It was possible, in the majority, to determine the incubation period, and without exception in all the severe cases, it was ten to eleven days.

The prodromal symptoms showed great uniformity and, in order of frequency, were: fever, headache, backache, nausea, chills, anorexia, insomnia. Fever at the onset ranged from 100°F. to 104°F., subsiding as the rash developed, except in the haemorrhagic cases. Headache was usually severe and backache was more uniformly present in this than in previous epidemics. The severity or otherwise of the prodromes was no criterion of the subsequent symptoms, except in haemorrhagic cases, in which, without exception, the prodromal symptoms were very severe. The prodromal period was usually 2 to 2½ days, the rash appearing on the third day.

#### CLINICAL TYPES

All types were represented, and may be classified as follows:—

1. Varioloid (modified by vaccination).....	13 cases
2. Discrete (mild and severe).....	18 cases
	1 death
3. Confluent.....	10 cases
	1 death
4. Haemorrhagic (pustular and purpuric).....	15 cases
	15 deaths

The outstanding features of each of these types are presented in the short clinical histories as follows:

#### *Varioloid (Modified Smallpox)*

*Case 18*—male, age 45, vaccinated in childhood, diagnosed first as

"flu". Prodromes were stormy: fever, intense backache, headache severe necessitating morphia; urine showing albumin 4, and casts. Symptoms subsided on appearance of the rash, though insomnia persisted. The rash consisted of a few discrete spots of normal distribution but rapid evolution. Patient recovered fully in 10 days.

*Case 55*—female, age 52, vaccinated 30 years previously. Contracted smallpox from her son, who died of the haemorrhagic form. Prodromal symptoms were mild, and rash consisted of about two dozen papules distributed on face, upper chest and forearms. Recovery was prompt and complete.

The husband had been vaccinated in childhood, and was the only one in this family of five to escape the disease.

#### *Discrete (Mild and Severe)*

*Case 13*—female, age 26, never vaccinated. Prodromes were headache, gastric distress and fever—diagnosed as "flu". On the third day the rash appeared on the face, then on the neck and chest, forearms and palms. The papules were discrete and fairly numerous. Her course was quite uneventful, and recovery was complete, with no marking.

While convalescing this patient acted as donor for blood given to another patient reported in this series.

A young son, who had been successfully vaccinated one year previously, escaped; but her husband, who had not been vaccinated since boyhood, contracted the disease.

#### *Confluent*

*Case 27*—female, age 3, unvaccinated. Prodromal symptoms were very mild, and a doctor was called because of the appearance of a rash. When admitted to the hospital the child had a temperature of 105°F.; there were many small, hard papules on the face, forehead, arms, legs and upper back. Those on the face, in a few days, became confluent and the patient very ill. Twenty cc. of whole blood from a convalescing patient was injected subcutaneously four days after admission. This little girl had a very stormy time but recovered, though her convalescence was prolonged by a troublesome series of boils. It is our impression that the injection of blood from a convalescent in this case was an important factor in the recovery.

*Case 49*—male, age 28, unvaccinated; objector. Prodromes were fever, backache, nausea and abdominal cramps. Rash appeared on the third day. It was profuse and by the seventh day had become confluent on the face, hands and feet. There were occasional haemorrhages into the pocks. This patient was literally covered with pocks, was intensely toxic and delirious, requiring restraint. The odour was extremely offensive, the patient being bathed in pus from the constant rupture of pustules, and the condition was so terrible that a bichloride

bath was given by lowering him on a sheet into a tub after the fashion of the typhoid bath of some years ago. The cleansing and stimulating effect of this procedure was so marked that it was repeated at intervals, and the patient, after a protracted convalescence, made a good recovery.

### *Haemorrhagic*

#### (a) *Haemorrhagica pustulosa*

*Case 21*—female, age 37. Said to have been vaccinated 35 years previously; no mark visible. The prodromes—headache, fever, sweating—were severe, and two days later a profuse papular rash made its appearance. The evolution was rapid, and the patient presented in the hospital a truly terrible picture. There was much involvement of the pharynx, oesophagus and trachea, feeding or even swallowing being most difficult, and after a few days impossible. Haemorrhages occurred into the pocks and between them. The rash was fully developed and, on the face, completely confluent. The patient was conscious until a few hours before death, which occurred on the tenth day.

#### (b) *Haemorrhagica purpurica* (Lobster)

*Case 23*—male, age 34. When admitted to hospital, temperature was 102°F. The face was swollen and covered by an erysipelatous rash extending down over the shoulders, arms and chest. Numerous petechial spots were noted on the forearms and in the axillae, and a macular rash covered the extremities and body. The mouth and lips were swollen and dirty, and there was much difficulty in swallowing. The rash never developed beyond the papular stage. The patient died on the third day after admission.

*Case 54*—female, age 30, unvaccinated. Was admitted to the hospital for gall stones and submitted to an operation. For two days following the operation she had a temperature, nausea and headache, which were regarded as post-operative. On the third day a diffuse erythematous rash appeared on the face and neck. The face was described as red, leathery and infiltrated. She was immediately removed to isolation because of the suggestive resemblance to previous haemorrhagic smallpox cases. Numerous papules appeared on the upper chest, back and arms, and later haemorrhagic areas developed over the whole body, involving particularly lesions of psoriasis from which the patient suffered. The patient died four days after appearance of the rash.

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# The Operation of Swimming Pools\*

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THE objective of swimming pool operation is to provide a place where swimming and bathing may be carried out under the best possible conditions of cleanliness, comfort and safety. In order to attain this end, a number of operations are necessary. These may be grouped as follows:

- (1) Methods of treatment of the pool water in order to maintain a clean, hygienic and attractive medium available for bathers at all times.
- (2) Methods of supervision of persons using the pool, formulated both as a protection to others and as a matter of individual safety.
- (3) Methods of handling bathing suits and towels, upkeep and cleanliness of dressing rooms, showers, etc., neglect of which would nullify to a considerable extent the good results accruing from efficient control of the two factors previously mentioned.

The original idea of constructing a large rectangular basin and filling it with water, which after use is discharged to waste, is unsatisfactory in many respects. It presupposes a supply of water which at the outset must conform to a high standard of quality. Where the "bathing load" is heavy, the water rapidly becomes unsightly and requires the pool to be emptied twice or more a week and invariably after one week's use, with further cleaning of the walls and bottom before refilling, with the result that the pool is placed out of commission quite frequently.

It also entails a considerable expenditure of fuel to raise the temperature of the incoming water to that suitable for bathing purposes and, where water rates are high, introduces another item of expense which cannot be lightly disregarded.

To-day we find the modern swimming pool fully equipped with recirculation, filtration and heating systems, enabling the pool water to be used over and over again, removing suspended and colouring matter and making available sources of water supply which are not included in municipal waterworks installations.

In order to maintain a pool water of good physical quality at all times, it is most desirable that operators make themselves familiar with the principles underlying the technique of water filtration.

In the majority of cases operators are unfamiliar with this particular problem, except perhaps in a very broad way, and, bearing this in mind, I shall devote a little more space than usual to a brief description of the process of filtration employed in the treatment of swimming pool water.

## *Filtration of Water*

Fundamentally, the system is identical with that employed in many

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small waterworks installations. The water leaving the pool outlet is pumped through a pressure filter containing a bed of sand supported on a suitably graded layer of gravel, collected by an arrangement of piping placed at the bottom of the filter, and then passed through some form of water heater before being discharged back into the pool. The filtration rate averages in the neighborhood of three gallons per minute per square foot of filter area, and this is usually satisfactory when the water supply is procured from drinking water systems which have previously undergone treatment at the municipal waterworks, but where use is made of independent sources of supply, it may be necessary to run the filters at a lower rate in order to obtain water of good quality.

In Canada, it is customary to provide filtration and pumping equipment of sufficient capacity to treat the entire contents of the pool once every ten or twelve hours. In England, however, it is strongly urged that a four to six-hour turnover period be considered as the absolute minimum. The turnover period is, of course, largely governed by the type and number of bathers using the pool; for example, a wide difference lies between an outdoor pool built by a municipality to provide safe bathing facilities for a large number of people during the summer months, at a low price of admission, and a pool maintained by a small private school where the "bathing load" is exceptionally light.

In the former case, peak loads may be heavy and unexpected and it is found that the equipment is woefully inadequate to cope with the additional burden imposed on it, while, in the latter case, the load is usually quite uniform from day to day and little trouble is experienced in providing an attractive pool at all times.

#### *Addition of Coagulant*

In order to ensure complete removal of colour and suspended matter and to aid in the removal of bacteria from the applied water, a coagulant, usually in the form of alum, or sulphate of alumina, is admitted to the filter influent. The alum reacts with the alkalinity normal to the water under treatment to produce aluminium hydrate, a flocculent jelly-like precipitate insoluble in water, which is deposited on the surface of the filter bed. Should this alkalinity be too low, the proper reaction will not take place and undecomposed alum may pass through the filter to the pool, setting up the condition known as "acid water" and bringing a host of complaints relative to sore eyes in its train. An excess of carbonic acid may also be present, which is undesirable on account of the corrosive action it exerts when brought into contact with metallic surfaces. It must also be remembered that "acid waters" may result when treating water of average alkalinity, if the addition of fresh water to the pool, in order to replace that lost by splashing and evaporation, is neglected, and, again, if the alum dosage is excessive, after-precipitation in the pool may take place when the make-up water is added, resulting in a turbid water.

In cases where the alkalinity is low it is necessary to supplement this to a point where the reaction with the applied alum is complete. For this purpose, sodium carbonate or soda ash is employed.

Both the coagulant and the soda ash are usually applied in solution form by various types of apparatus and here it might be well to stress the need for dosing devices which are susceptible of more accurate adjustment than those commonly employed in swimming pool work.

### *Backwashing the Filter*

Extreme care is necessary when backwashing the filter in order to reduce sand losses to a minimum and to leave the bed in such a condition that, after having placed it in operation, it may quickly regain the efficiency temporarily lost during the washing period.

Washing the filter is carried out either by water obtained direct from the main or by reversing the flow of pool water through the filter.

When main water is used, provision should be made for reducing the pressure to a point where the velocity of the wash will not cause excessive disturbance of the sand bed and abnormal sand losses. Before commencing to wash, the water remaining in the filter should be drawn down to the level of the sand; the wash water should be gradually applied until the maximum rate is reached and washing continued until the waste water is reasonably clear when viewed through the sight-glass placed on the discharge line to the sewer. Overwashing the filter should be avoided, as it is most desirable to allow some aluminium hydrate to remain on the surface of the sand when the filter is again placed in operation. The filter should also be washed only when the loss-in-head gauges indicate that this is necessary.

Filters require to be inspected at regular intervals and, when conditions warrant it, they should be placed out of commission and the filtering medium replaced. Hair and lint which passes the pump strainer tends to mat together in the body of the filter and is most difficult to remove by backwashing.

### *Aeration*

Aeration of the water as an adjunct to filtration has attained some prominence in the treatment of indoor swimming pool water in England, but, up to the present, I am not aware that pools on this continent make provision for this phase of treatment.

English practice is to aerate the water immediately before or after filtration and before chlorination, and it is claimed that oxidation of organic matter is materially assisted and that obnoxious gases entrained in the water are displaced and are conveyed outside the building. From the standpoint of odour alone, it would be interesting to learn how efficacious is the process, as many pool rooms possess a distinctive odour, variously described as weedy, musty or chlorinous, which may be objectionable to hypersensitive nostrils.

*Supplementary Methods of Cleaning*

However well-designed and well-operated, filtration systems will not completely remove all suspended matter added to the pool via the bather. Certain "dead spots" are created in the pool when agitation of the water when in use has ceased, and it is here that material in suspension settles to the bottom. In addition, dust and light particles of foreign matter, and, in the case of open-air pools, leaves and other debris, will collect on the surface of the water. Pool deposits are best removed by the use of a suction cleaner, as brushing the floor of the pool towards the outlet only too frequently results in the material being disturbed again settling to the bottom after brushing has ceased. The removal of floating substances may be accomplished by adding fresh water to the pool until it overflows into the scum gutter and may be hastened by hosing the surface of the pool.

It is important so to regulate the normal water level of the pool that splashing while in use will assist in flushing the scum gutters without being so excessive as to flood them and re-enter the pool. Supplementary methods of cleansing, as outlined above, are particularly essential in the case of open-air pools surrounded by sandy beaches.

*Supervision of Bathers*

All persons who are, or who have recently been, suffering from, or exposed to communicable diseases, should obviously be denied admission to the pool, as also those afflicted with skin rashes, boils, etc. All persons should be compelled to take thorough showers with the use of soap before donning bathing suits, and the usual precautions taken to guard against physical injury and accident.

The possibility of transmission of disease through the medium of suits and towels, where these articles are rented for use, is one which does not seem to have received the attention it deserves. It is most essential that they be carefully washed, disinfected and dried and furthermore not replaced for delivery in the bags in which they were received, unless the latter have undergone the same treatment. Neither should they be allowed to come in contact with 'dirty suits and towels. Suits of undyed wool or cotton are preferable to those of more lurid colour, as the cheaper varieties frequently lose their dye in the water, resulting in a murky pool.

In some localities much trouble is experienced with the occurrence of epidermophytosis—"athlete's foot". This annoying disease has been found to be associated with the use of dressing-rooms, shower baths and runways connected with swimming pool plants, and, as one means of prevention, it is advisable to eliminate, as far as possible, the use of wooden duck boards and coarse matting, which rapidly become saturated with moisture and provide excellent breeding grounds for the fungus. At Buffalo, it is also claimed that short immersion of the feet in a one per cent sodium hypochlorite solution, held in a shallow well

placed between the dressing rooms and the pool, has given good results as a preventive.

Showers should be kept in good repair at all times and an adequate supply of hot and cold water provided for the use of bathers, while pieces of soap, which after use may lie about the floors, should be removed at frequent intervals.

Open air pools are frequently provided with foot baths and showers operated in such a way that bathers are compelled to pass through them before gaining access to the pool, the object being, of course, to remove adherent sand, etc., acquired while lying about the beach. Attendants should make a point of seeing that the showers are used effectively and should discourage persons who endeavour to run through them with a resulting minimum of exposure to the spray.

Dressing room equipment should not include a common hair brush and comb, neither should lockers be regarded as storehouses for unclean gymnasium suits and shoes, but rather as receptacles for holding clothing during the bathing period only. At all other times they should remain empty.

Needless to say, dressing rooms should receive the same scrupulous care as that given to other portions of the plant and it is good practice to spray them occasionally with some reliable disinfectant.

#### *Importance of Operating Records*

The collection and careful scrutiny of operating data will very often assist in locating weak points which may develop in swimming pool installations, and, for this reason, records should be accurately and regularly compiled. They should include all the detail of filter operation, amount of chemicals applied, amount of fresh water used to replace losses from splashing, etc., number of bathers using the pool and so on, and in addition much useful information could be obtained relative to operating costs, which would be of extreme value, particularly when so many municipalities undertake the burden of financing the construction and operation of public pools.

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# Tularemia in Ontario

## A Report of Five Cases

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THE cause of tularemia, *B. tularensis*, was described first by McCoy and Chapin in 1912 as the etiological factor in a plague infection among ground squirrels. The first demonstration of infection in humans was made by Wherry and Lamb (1) in 1914. Since that time numerous cases have been reported throughout the United States, and Francis (2) in 1928 analyzed 679 cases and described four clinical types of the disease: ulceroglandular, oculo-glandular, glandular and typhoidal.

Considering the close geographical relationship existing between the United States and Canada, it seems natural to expect that tularemia would be encountered with equal frequency in this country, but up to the present time only four cases have been reported. McNabb (3) in 1930 reported the first case in Ontario. In 1931 Ootmar (4) reported a case in British Columbia and Cramer (5) reported another one in Ontario. Shaw and Jamieson (6) reported the fourth case in Alberta in 1932. The following is a report of five cases which have occurred in the vicinity of London in the last year.

### CASE I

R. F. J., an adult male about 69 years of age, on May 1, 1931, consulted Dr. W. C. Sproat of Seaforth, to whom I am indebted for permission to publish this history.

#### *Complaints*

General malaise, headache, chills, pain in epigastric region.

#### *History*

This patient is an elderly male who is almost totally blind in both eyes due to bilateral optic atrophy and who has been unable to leave the vicinity of his home for some years. There is no history of any exposure to rabbits or other animals. He has been using flax-seed soaked in cold water as a laxative daily. The flax-seed is purchased locally and is kept in a bin to which rats and mice have free access. He has a history of previous gastric symptoms due to a chronic gall bladder condition.

#### *Physical Examination*

Temperature 101° F.; pulse 96; respirations 24. There is moderate tenderness in the right upper quadrant of the abdomen.

A provisional diagnosis of chronic cholecystitis was made.

#### *Progress Notes*

The following day the patient was much improved. On May 3, 1931, his temperature, pulse and respirations were normal and he had no complaints other than occasional slight chill. On May 8, 1931, his temperature again rose to 102° F., with marked chill and pain in the epigastrium. A sample of whole blood was submitted to the Provincial



Laboratory at Toronto and a report showing complete agglutination for *B. tularensis* in dilution 1-80 was returned.

May 13, 1931. The patient's condition was much improved; no complaints; physical examination negative. The blood test was repeated.

May 18, 1931. Another exacerbation of temperature with chills and pain in abdomen.

May 30, 1931. Temperature again normal; patient had no complaints. Blood test repeated.

#### Laboratory Findings

May 8, 1931—Provincial Laboratories, Toronto.

Complete agglutination *B. tularensis* 1-80.

May 13, 1931—Provincial Laboratories, Toronto.

Complete agglutination *B. tularensis* 1-160.

May 30, 1931—Institute of Public Health, London.

Complete agglutination *B. tularensis* 1-640.

#### Diagnosis

Tularemia—typhoidal type.

### CASE II

F.F., 40 years of age, a grocer and butcher by trade.

#### Complaints

Weakness and feeling of exhaustion, crampy pains in abdomen with tenderness in right lower quadrant, distension of abdomen.

#### History

The patient, while sweeping his store about July 10, 1931, blistered his left hand between thumb and index finger. He denies handling rabbits or other animals at this time, but states he was handling large quantities of fresh vegetables. The hand became quite red and sore. Systemic symptoms appeared about July 17, 1931. On July 20, 1931, he consulted his family physician, who made a diagnosis of "intestinal flu." On July 27, 1931, as his condition was not improving and his own physician was out of town, he consulted Dr. C. M. Carruthers, Sarnia, to whom I am indebted for this history.

#### Physical Examination

July 27, 1931. Temperature 102° F., pulse 96, respirations 24. The abdomen was distended, with moderate tenderness in right inguinal region. Spleen was not palpable.

A provisional diagnosis of typhoid fever was made and a sample of whole blood submitted to the Institute of Public Health, London, for Widal test. Routine agglutination tests on the blood serum showed positive agglutination for *B. tularensis*.

#### Progress Notes

The crampy intestinal pains became more frequent and intense and the abdomen markedly distended. Bright erythematous spots would appear over the abdomen but would quickly disappear. The temperature was septic in type, with a daily range from 99°F. in a.m. to 104°F. in p.m. The drop in temperature was accompanied by profuse sweating. Marked photophobia was present. The urine was clear, the bowels were loose throughout. The appetite was poor, but fluids were taken freely. On August 1, 1931, the axillary and cervical glands became markedly enlarged; the cervical glands were so large that difficulty in swallowing was encountered. The temperature fell by lysis during the third week but convalescence was prolonged and the patient was unable to return to work for seven weeks after temperature was normal.

*Laboratory Findings*

- July 27, 1931. Macroscopic agglutination *B. tularensis* 1-160.  
*Br. abortus* 1-10  
June 1, 1932. Macroscopic agglutination *B. tularensis* 1-640.  
*Br. abortus* 1-10

*Diagnosis*

Tularemia—typhoidal type.

**CASE III**

H.A., 24 years of age, carpenter's helper by trade.

*Complaints*

Bilateral enlargement of axillary glands.

*History*

Patient has been unemployed for the last year and during winter months was trapping coons, mink and muskrats. He admits handling rabbits occasionally. He visited his traps last on April 4, 1932, his only catch on this occasion being one muskrat. Three days later he noticed a series of ulcers on both hands. The ulcers were about one cm. in diameter and appeared as small pustules which broke, leaving an ulcerated area. Shortly after, a painful swelling appeared in the right axillary region, and smaller painless nodules in the left axilla and both inguinal regions. The swelling in the right axilla became progressively larger and the patient presented himself at the Out Patient Department, Victoria Hospital, London, on May 14, 1932. He was assigned to the surgical service under care of Dr. R. A. Johnson. A provisional diagnosis of simple adenitis was made and the patient instructed to return a week later for observation. On his return a sample of whole blood was submitted to the Institute of Public Health, and a diagnosis of tularemia was made.

*Physical Examination*

Temperature 99°F., pulse 112, respirations 22. There was marked bilateral enlargement of the axillary glands. The right axilla was occupied by a soft, tender, fluctuant mass about the size of a small orange. The mass in the left axilla was about one-half the size and firm on palpation. Several enlarged inguinal glands about the size of a pigeon's egg were noted. The scars of ulcers noted in history were present on both hands.

*Progress Notes*

The mass in the right axilla became larger and softer and was opened on June 3, 1932. A profuse purulent exudate was obtained. The left axillary glands also suppurated and were incised on July 15, 1932. The inguinal nodes gradually subsided. The patient had no complaints while in hospital other than some discomfort due to the operative procedure.

*Laboratory Findings*

- June 1, 1932. Macroscopic agglutination *B. tularensis* 1-2560.  
*Br. abortus* 1-160

Blood culture—sterile.

- June 3, 1932. Pus from right axilla—culture sterile.

- June 15, 1932. Pus from left axilla—culture sterile.

Guinea-pig inoculation—negative.

- July 21, 1932. Macroscopic agglutination *B. tularensis* 1-2560.

*Br. abortus* 1-160

Agglutinin absorption test—positive for *B. tularensis*.

*Diagnosis*

Tularemia—ulceroglandular type.

## CASE IV

W.P., 42 years of age, a carpenter by trade.

*Complaints*

Generalized lymphadenopathy.

*History*

This patient served overseas with the Canadian Army during the Great War and since his discharge has been under the observation of the Department of Pensions and National Health, receiving treatment from various institutions and from the Out Patient Department at Westminster Hospital, London. Repeated examinations have been made by the Board of Pensions examiners and the patient is regarded as a chronic cardiac case and a suspected pulmonary tuberculosis, although sputum examinations have never been positive for acid fast bacilli.

He was unemployed during the last winter and was associated with H.A., CASE III, in trapping to augment his income. He denies handling any rabbits but admits catching and skinning coons, mink and muskrats. On April 7, 1932, he reported to the Out Patient Department, Westminster Hospital, with some cough, weakness and general malaise. His temperature was 99°F., pulse 92. He was thought to be suffering from an intercurrent respiratory infection and was given a cough mixture. On April 18, 1932, his condition was unchanged.

His association with H.A. was not discovered until June 1, 1932, when, at the request of the author, a sample of whole blood was submitted to the Institute of Public Health and a diagnosis of tularemia was made.

*Physical Examination July 4, 1932.*

The patient was seen in consultation with Dr. Douglas of the staff of Westminster Hospital. The patient is an adult white male, considerably underweight. No scars of superficial ulcers on hands can be found and patient denies having any skin lesions. The axillary, inguinal, cervical and occipital glands are all slightly enlarged; one gland in the left axilla about the size of a pigeon's egg. The spleen is not palpable.

*Laboratory Findings*

June 16, 1932. Macroscopic agglutination *B. tularensis* 1-1280.

Blood culture—sterile.

July 21, 1932. Macroscopic agglutination *B. tularensis* 1-2560.

*Br. abortus* 1-80

Agglutinin absorption test—positive for *B. tularensis*.

*Diagnosis*

Tularemia—glandular type.

## CASE V

H.K., 43 years of age, laborer by trade.

*Complaints*

Enlargement of epitrochlear gland.

*History*

During the winter months this patient has been accustomed to earn his living by trapping. On April 18, 1932, while going to his traps he slipped and fell in the woods, injuring the nail of the middle finger on the left hand. The wound bled for a time, but no precautions were taken. On arrival at his traps, four muskrats in good condition were found and were skinned at once. Two days later he consulted Dr. R. A. Johnson with an infection about the injured finger nail. A provisional diagnosis of a paronychia was made and the wound was treated with iodine gauze. The patient returned a week later

for observation. The infection about the finger nail was found to be healing nicely but the patient complained of general malaise and had a temperature of 100°F. Examination revealed an enlarged left epitrochlear gland about three cms. in diameter and several enlarged glands in the left axilla. He did not seem seriously ill and was asked to report again in another week, but did not return until June 15, 1932. At this time there was a mass in the left axilla about seven cms. in diameter and the epitrochlear gland was about four cms. in diameter. The glands were firm on palpation. The patient had no other complaints. A sample of whole blood was submitted to the Institute of Public Health and a diagnosis of tularemia was made.

#### Progress Notes

The enlarged glands gradually subsided without suppuration. The axillary glands at the present time are just palpable but the epitrochlear gland still forms a visible swelling above the inner condyle of the left humerus about three cms. in diameter.

#### Laboratory Findings

June 15, 1932. Macroscopic agglutination *B. tularensis* 1-2560.

*Br. abortus* 1-80

Blood culture—sterile.

Guinea-pig inoculation—negative.

July 21, 1932. Macroscopic agglutination *B. tularensis* 1-2560.

*Br. abortus* 1-80

Agglutinin absorption test—positive for *B. tularensis*.

#### Diagnosis

Tularemia—ulceroglandular type.

#### DISCUSSION

None of these cases was diagnosed clinically without the aid of the laboratory. It has been a routine procedure at the Institute of Public Health to test for agglutinins for *B. tularensis* on all specimens submitted for the Widal test and the value of this procedure is well established in the typhoidal types of tularemia. Francis, however, found only 28 typhoidal types out of 679 cases, the large percentage of cases falling into the ulceroglandular group. It seems highly probable that more cases should have been recognized in Canada and the general practitioner should be on the watch for the different clinical manifestations of this interesting disease.

In three of these cases, the infection appears to have been contracted from muskrats. These animals belong to the rodent group which are known to be naturally infected. This fact seems of considerable importance, since these animals are trapped extensively throughout Canada.

#### REFERENCES

- (1) Wherry, William B., and B. H. Lamb, *Infection of Man with Bacterium Tularensis*, J. Infect. Dis., 15: 331 (Sept.), 1914.
- (2) Francis, Edward, *Symptoms, Diagnosis and Pathology of Tularemia*, J. Am. M. A., 91: 1155 (Oct. 20), 1928.
- (3) McNabb, A. L., *Tularemia—The First Case Reported in Canada*, Canad. Pub. Health J., 21: 91 (Feb.), 1930.
- (4) Ootmar, G. A., *A Tularemia Case Report*, Canad. Pub. Health J., 22: 207 (Apr.), 1931.
- (5) Cramer, J. B., *A Case of Tularemia*, Canad. Pub. Health J., 22: 568 (Nov.), 1931.
- (6) Shaw, R. M., and H. C. Jamieson, *Tularemia, with Report of a Case*, Canad. M.A.J., 26: 305 (Mar.), 1932.

# Final Report of the Committee on the Definition of Stillbirths\*

EUGENE GAGNON, M.D.

*Statistician, Department of Health, Montreal, Chairman*

**L**AST year after the progress report of your committee on the definition of stillbirth was presented in Regina, it was decided that the committee be kept in existence for another year, in order that more complete information be obtained on the procedure followed by the countries adhering to the definition adopted by the Health Committee of the League of Nations.

Your chairman therefore wrote to Dr. Biraud asking him to transmit any information which the League of Nations might have gathered regarding special forms for reporting stillbirths, instructions to registrars, physicians, etc. The answer, owing to a prolonged illness of Dr. Biraud, came only recently and was disappointing, being to the effect that the League has neither inquired into the question nor has been informed of any legislation or measure which may have been adopted, and that any information obtained in this matter would be transmitted to us as soon as received.

As nothing has been forwarded to us, and as a scrutiny of the official health reports from various nations and cities has not revealed any new fact or legislation, your committee must confess that no new information has been obtained. The opinion, however, is expressed that this question has already been sufficiently threshed out in the paper<sup>1</sup> of the chairman, read in this city in 1930 and the progress report issued in 1931, to enable the Section of Vital Statistics of the Canadian Public Health Association to reach conclusions and to recommend that action be taken on its conclusions by the Dominion Bureau of Statistics and by the provinces. A summary of the work done in connection with this question may help in an understanding of the committee's conclusions.

In his paper read in 1930, the chairman showed the discrepancies between statistics of "stillbirth" due to many causes and more especially to the varying legislation in the provinces, and to the particular mental attitude of those who are called to fill birth and death certificates. He laid great stress upon the need of a definition which would be acceptable to all provinces, that definition being intended to apply to statistics only and to have no bearing whatever on the legal side of the question. Hence, the appointment of the committee of the Association to study this question and to find a proper definition. The definition recommended by the committee is similar to the one adopted by the League of Nations which reads as follows: "A dead birth is the birth of a foetus after 28 weeks or 6½ months of pregnancy, measuring at least 35 CM. from the crown of the head to the sole of the heel, in which

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<sup>1</sup>Canad. Pub. Health J., 22: 16 (Jan.) 1931.

pulmonary respiration does not occur; such a foetus may die either: (A) before, (B) during, (C) after birth or complete extrusion of the head, trunk, limbs from the body of the mother, but before it has breathed." The committee considers that the suggested addition of the words "severance of placental cord" to the definition of complete birth, is not liable to add many to the number of stillbirths, and the committee has no objection to the inclusion of these words in the definition. On the contrary, if such an infant does breathe, it is a live birth.

The Dominion Bureau of Statistics in the "Physicians' Pocket Reference Book," page 26, insists on the importance of specifying the age at death of a new born baby, stating:

"Age is of special importance, and as a check on the accuracy of the statement, the date of birth is also required. For infants under 1 day old, state the hours, or even the minutes if less than 1 hour old. This is necessary in order that stillbirths may be distinguished with absolute precision from deaths of children born alive.

"Stillbirths should be registered as both births and deaths. They should be compiled, in statistical tables, neither as births nor deaths but separately as stillbirths.

"In the case of stillborn children or of children living a very short period, the following two facts are of special importance for proper statistical classification:

(a) Period of gestation.

(b) Did the child breathe after complete birth?

"The medical certificate of a stillborn child should always contain the word "stillborn" or "stillbirth." The cause of a stillbirth should be given wherever possible."

This is indeed a very commendable addition to the previous edition of the pocket reference book.

Special emphasis must be laid on the last paragraph in which it is said that the medical certificate of a stillborn child should always contain the word stillborn. This presupposes that the physician, or any other person filling the certificate, already knows our special interpretation of the word stillbirth.

It has been mentioned previously that the period of gestation and breathing are important details, but if these two questions are not specifically asked on the form used, how often will these details be given? Stillbirths are not of very common occurrence in the average physician's practice. The physician who is called to fill a death certificate for a new-born baby may have read very carefully the pocket reference book, or he may not have read it at all. Supposing he read it a month ago and fully understood the meaning of the paragraph relating to stillbirths, he is very likely, unless he is gifted with an uncommon memory, to have forgotten all about it or, if he still remembers something of it, he will be at a loss to remember where he read it. Nobody will question, I presume, that the chairman of this committee is keenly interested in this matter. He has seen with great pleasure this paragraph on stillbirth included in the pocket reference book, but while preparing this report, and desiring to quote the text of the booklet, he had some difficulty in finding the page on which it appears. This illustrates to some extent what we may expect from the ordinary practitioner who is called on to state that the child was "stillborn" or not, according to our definition.



*Desirability for a Special Report Form.*

This brings the question of his mental attitude about stillbirth. Does he belong to the category of those who take a broad view of the subject and consider as stillbirths, children at full term of pregnancy, who have breathed after complete birth—(I have quite recently seen a baby qualified by the physician as stillbirth which had breathed for half an hour); or does he belong to the category of those (Roman Catholics for instance), who would declare as a live birth a child who did not show any sign of life at birth, but in whom, physiologically speaking, all life was not extinct? These, I admit, are two extreme cases, one on each side of the true line which, in this instance, is our definition of a live and stillbirth. At one end, we find a physician qualifying a real live birth as a stillbirth, and at the other end, one reporting as a live birth a real stillbirth. Between these extremes, however, there is room for a great number of misinterpretations and your committee does not see any other solution than the use of a special form for stillbirths. This seems most reasonable because stillbirths are a class by themselves in vital statistics; they are neither classed as a birth nor a death, they are purely and simply "stillbirths". Why then should they be reported as birth and death?

The province of Quebec has already solved the difficulty by adopting a form for stillbirths which is a combination of the birth and death form. On the medical portion, specific questions are asked regarding the duration of pregnancy, also whether the heart or the cord were pulsating after birth and if the child has breathed or not: if so, how long. We have on hand, therefore, the needed information to classify these births according to our definition and we are independent of the mental attitude of the physician towards this question.

We have obtained so much satisfaction with this form, as far as the city of Montreal is concerned, that we hope it will be adopted by the other provinces. We know that, according to the English law, a child whose heart was beating after birth must be considered as a live birth. Our form gives the registrar the necessary information to make the proper entry in his books, and to register such births as livebirths, although they may be classed as stillbirths in statistical tables.

It has also been felt that this form should be extended to all children dying within 24 hours of their birth, provided the birth has not already been registered, on account of the fact that our Roman Catholic physicians have a tendency to report as a live birth children who have not breathed but whose life was not altogether extinct, as explained above.

We recognize that these conditions do not exist, at least to the same extent, in the other provinces.

This procedure is not contrary to the spirit of the order-in-council under which the work is carried on, and does not destroy the uniformity of the national system, because the only objection (if this can be considered an objection) would be that this method enables us to furnish the Dominion

Bureau of Statistics with more accurate data than would be possible with the former system of a birth and a death certificate.

Regarding uniformity in the national system, it has been explained that the stillbirth form is a combination of the birth and death forms and it is very simple to make up from it the two forms required by the Dominion Bureau of Statistics. The only difference is that for each stillbirth the province has only one form to handle while the Dominion has two.

*Resolution.*

Having considered these facts, the committee recommends that the Section of Vital Statistics adopt a resolution to the following effect:

(1) That the definition of live and stillbirth as outlined in this report be accepted by the provinces and the Dominion Bureau of Statistics;

(2) That stillbirths be reported on a special form;

(3) That the provinces which may deem it an advantage to extend the use of this form to children born alive but whose birth has not yet been registered, be at liberty to do so, provided they are able to give to the Dominion Bureau of Vital Statistics all data required from them and in the form prescribed.

And further that:

If adopted by the section, the resolution be forwarded to the committee on resolutions of the Association for consideration and presentation to the annual meeting.

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**Twenty-Second Annual Meeting**

**Canadian Public Health Association**

**SAINT JOHN, N.B.**

**JUNE 19, 20 and 21, 1933**

# The Laboratory History of Diphtheria in Hamilton\*

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THE purpose of this paper is to present a historical, rather than a statistical or scientific study of the relation of laboratory work to the incidence of diphtheria in Hamilton for the past twelve years, during which time an active campaign of immunization has been carried on. The practical results from an epidemiological point of view are perhaps not unfamiliar to public health workers, having been previously reported. The bearing which the results of this campaign have had on the amount and character of the laboratory work, is, we think, as striking and illuminating as the epidemiological results have been. Elsewhere in this paper, tables of statistics are shown which demonstrate both these features. Hamilton, the population of which grew from 108,143 to 154,701 during the period 1920-1931, forms a unit of population of a size which lends itself very well to the carrying out of such a programme of immunization, and the wholehearted co-operation of the medical profession and the school authorities made possible the degree of success attained.

In the laboratory diagnosis of the disease we have followed the standard method of examining smears made from 18 hour cultures on Loeffler's blood serum medium. The outfit supplied consists of two sterile swabs, two tubes of sterile and moist Loeffler's blood serum, enclosed in a box with the data card, for inoculation by the physician or nurse. The size of the city makes this method easy of application. For some years we made our own medium by securing beef serum from the abattoir, but now we use medium made, as required, from dessicated powdered Loeffler's medium, and the results are entirely satisfactory. Diagnosis is made routinely on morphology alone, using either Neisser's or Albert's stain, and virulence tests are made in the case of suspected carriers. During the earlier years of this period, the number of positive smears occurring in cultures from undoubted clinical cases was sufficiently large to keep one in excellent practice in the recognition of the typical Klebs-Loeffler bacillus. During the past few years, however, the number of positive smears has fallen off to such an extent that weeks at times go by without our seeing one; indeed, for the first four months of 1932, over twelve hundred cultures have been examined without one being found positive. All positive smears are checked by at least two of the staff before the report is sent out. Every case of

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suspected diphtheria has from three to five cultures made if negative findings are recorded, so as to avoid the omission of any cases which are really diphtheria.

In table I, the years 1920, 1921 and 1922 show the incidence of the disease and the number of laboratory examinations carried out under pre-immunization conditions. Immunization was commenced in January, 1922, using toxin-antitoxin mixture. Since 1926 immunization has been carried out by using toxoid (anatoxin Ramon) in three doses. Clinics were established at the public schools, and children of school age (*i.e.*, from six to sixteen years of age) whose parents had given written consent, were inoculated. In 1923 clinics for the immunization of children of pre-school age (*i.e.*, children under the age of six years) were started. The Schick test was used extensively at first, but its routine use was later discontinued, all children presenting themselves being immunized. It was thought better to add to existing anti-body in those with negative Schick tests, than to run the chance that a few of those with negative Schick tests, whose anti-body content was of the border-line type, might not have enough anti-body to resist a virulent infection. Reactions have been few and none of any seriousness has been encountered. The influence which this campaign has had on the incidence of the disease, and especially on the amount and results of the laboratory work carried out in connection therewith, is shown in the following tables.

Table I shows also the relationship of case incidence and death rate to the total number of cultures taken and to the number of positive results recorded. The peak year for laboratory examinations was 1924. Laboratory examinations have remained practically stationary at slightly over 4,000 per year for the last four years of the series. Positive cultures in 1931 dropped from around 90 to 26, with a drop in case incidence from around 12 to 5. Deaths from the disease have dropped to 0 and we have not had a death from a bacteriologically proven case of diphtheria for almost a year and a half. No positive cultures have been found in 1932 out of a total of over 1,400 cultures.

The steady increase in population of the city during the twelve-year period is shown in Table I. The peak year as to the number of cultures was 1924, when a total of 17,237 cultures, of which 1,216 were positive, were received. Thereafter is seen a rapid drop to approximately 4,500 per year, in spite of a constantly increasing city and school population. For the twelve-year period the city population showed an increase of 43 per cent, while the school population increased 100 per cent. For the last four years the total number of cultures has remained about the same, and it is likely that no material increase in this number will occur, except in proportion to an increasing population.

It is to be noted that in 1932 the number pre-school age children immunized equalled the number of live births for the year. If this proportion could be maintained it will be seen that, very soon, all child-

TABLE I  
DIPHTHERIA CASES, DEATHS AND CULTURES  
Hamilton, 1920-1932

Year	City population	Cases of diphtheria	Deaths	Total cultures	Positive cultures
1920.....	108,143	596	44	8,261	1,040
1921.....	114,766	608	41	9,645	1,234
1922.....	118,243	747	32	13,866	934
1923.....	120,234	381	26	12,980	717
1924.....	120,945	501	32	17,237	1,216
1925.....	122,238	232	14	11,244	693
1926.....	122,459	121	3	6,805	248
1927.....	123,359	11	1	5,805	96
1928.....	134,566	13	3	4,205	91
1929.....	143,129	14	1	4,677	93
1930.....	150,065	12	2	4,152	85
1931.....	154,701	5	0	4,638	26
1932.....	153,501	1	0	3,929	85

TABLE II  
REDUCTION IN NUMBER OF CULTURES  
CO-INCIDENT WITH INCREASING PERCENTAGE OF POPULATION IMMUNIZED

Year	School population		Pre-school population		Total cultures
	School population	Per cent immunized	Live births	% Pre-school immunization in relation to live births	
1920.....	15,000		3,407		8,261
1921.....	16,800		3,550		9,645
1922.....	17,400		3,295		13,866
1923.....	21,486	4.67	3,117	15.58	12,980
1924.....	21,227	18.17	3,035	27.77	17,237
1925.....	21,237	9.67	3,017	14.18	11,244
1926.....	23,716	11.39	2,820	46.12	6,805
1927.....	24,429	11.21	2,709	54.11	5,805
1928.....	25,034	11.71	2,660	79.51	4,205
1929.....	27,108	6.84	2,614	68.40	4,677
1930.....	26,509	7.45	3,138	81.93	4,152
1931.....	31,725	6.34	3,061	85.23	4,638
1932.....	32,000	6.40	2,890	100.00	3,929

TABLE III

ESTIMATED NUMBER OF IMMUNIZED CHILDREN  
CUMULATIVE EFFECT

Year	School population	School children		Pre-school children	
		Number immunized	Number immunized still attending school in 1931	Number immunized	Number immunized now attending school in 1931
1923.....	21,486	1,005	201	486	486
1924.....	21,227	3,859	1,158	843	843
1925.....	21,237	2,055	220	428	428
1926.....	23,716	2,703	1,351	1,302	1,302
1927.....	24,429	2,738	1,638	1,466	1,466
1928.....	25,034	2,931	2,051	2,115	1,692
1929.....	27,108	1,842	1,480	1,788	1,171
1930.....	26,509	1,976	1,576	2,571	1,028
1931.....	31,725	2,011	1,809	2,609	520
Total.....	26,443	2,049	11,485	2,895	8,936

Total immunized children in school in 1931—20,420  
or 64 per cent of the school population.

TABLE IV

## SOURCES OF POSITIVE CULTURES

Year	1928	1929	1930	1931	1932
Children's Hospital.....	19	13	11	10	8
Hospital Wards.....	11	12	7	5	2
Isolation Hospital.....	6	11	16	2	32
Health Dept. Nurses.....	37	30	26	8	42
Physicians.....	18	27	25	1	1
Total Positive Cultures.....	91	93	85	26	85
Total Cases of Diphtheria (in city)...	13	14	12	5	1
Deaths.....	3	1	2	0	0

TABLE V

## POSITIVE CULTURES ACCORDING TO CLINICAL SOURCE

Year	1928	1929	1930	1931	1932
Ear Cultures.....	43	29	18	6	13
Nose Cultures.....	11	7	16	5	17
Throat Cultures.....	37	57	48	15	55
Wound Cultures.....	..	..	2	..	0
No. of Individuals.....	58	60	43	20	12
Total Positives.....	91	93	84	26	85



ren of pre-school age will have been immunized and in that case the amount of immunization necessary among those of school age would sink approximately to zero.

In Tables II and III is shown the rapid increase in school population, together with the degree of immunization carried out on both school and pre-school children. The administration of the Adolescent Attendance Act, together with the fact that in times of depression school attendance is always greater, accounts for the doubling of the school population in this period. As will be seen, the birth rate shows approximately the same absolute figures, in spite of the increased city population, being slightly lower in good times and rising somewhat in times of depression. The percentage of immunizations of school children perhaps looks small, but it must be remembered that if we take school age from six to sixteen years these figures are cumulative, and the same applies to the percentage of pre-school children immunized. As a result, the influence on this case rate and on the laboratory work is also progressive and cumulative, as the tables show. Dr. Roberts, Medical Officer of Health, informs me that there are at this date actually about 70 per cent of the school population immunized.

In Tables IV and V appears an analysis of the positive cultures secured during the last four years of the period, when the total number of cultures remained around 4,000. In the children's hospital routine cultures are taken on admission, and while morphological K.L. bacilli are occasionally found, virulence tests show that they are nearly always avirulent. In 1931 only one positive culture was sent in by a private physician. Most of the positive cultures were sent in by the Health Department nurses, who keep a very close check on sore throats of all sorts.

We have tried to show briefly the effect of immunization on the incidence of diphtheria and on the laboratory work and findings. The effect on the incidence has been shown by Dr. Roberts.<sup>1</sup>

We desire to express to Dr. James Roberts, Medical Officer of Health, our thanks for the kind assistance of himself and his staff in furnishing statistical and other information in the preparation of this paper.

#### REFERENCE

- <sup>1</sup>James Roberts, M.D. "A Campaign against Diphtheria," *Canad. J. Med. and Surg.*, Feb., 1931.
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## THE MENACE OF SMALLPOX

MANY physicians in Canada to-day would express surprise at the use of the word "menace" in regard to smallpox. In their practice during the past twenty or thirty years they have seldom met with the disease, or the cases seen have been of the very mild form, so that it is only the occasional physician who has a vivid picture of severe smallpox. Medical students seldom have the opportunity of seeing such cases and too often, consequently, instruction in smallpox is either omitted or inadequately presented. When malignant smallpox, particularly the haemorrhagic type, appears suddenly and unexpectedly, the first case or cases are very apt to be wrongly diagnosed, thus permitting a widespread dissemination of the disease in the community. Some public health officials, particularly in England, have engaged in an extended controversy regarding the so-called alastrim, or variola minor, and control measures. Some have even suggested that this disease should be allowed to spread, as an attack confers a degree of immunity to variola major. There is now, however, no doubt that this mild disease is smallpox. With the familiarity with this form of disease and the relative rarity during recent years of variola major, there has passed, to a large degree, the old-time "respect" for smallpox, and there have passed, too, vigorous efforts for protection by vaccination.

The outbreak of virulent smallpox in Vancouver, as recorded by Dr. J. W. McIntosh, brings to mind other epidemics of this disease in Canada. The disastrous Montreal epidemic of 1888, in which 3,164 deaths occurred within the space of a few months, made smallpox history and was so impressive that vaccination in Quebec is still much more complete than elsewhere in Canada, with the exception of New Brunswick. The first case was dead and buried before the disease was diagnosed. Of the 67 cases reported, 32 terminated fatally. The epidemic was cut short in the next three weeks by the promptness of action and the efficiency of the health department.

Certain features of the Windsor and Vancouver epidemics are common to both. Both cities are modern in every detail, possessing splendid health departments. They were alike, too, in having populations that had generally disregarded vaccination. In Windsor, haemorrhagic smallpox came as a bolt from the blue, and the errors in diagnosis, even by experienced consultants, permitted many contacts. In Vancouver, after a few mild cases were reported, without warning haemorrhagic cases appeared, and again difficulties in diagnosis were encountered, the first diagnosis made being measles. In both cities the epidemics were cut short and promptly controlled by the efficient action of the health authorities.

Both epidemics reveal the remarkable protection afforded by vaccination.

Of the cases that had never been vaccinated, 53 per cent resulted fatally in Vancouver and 71 per cent in Windsor. In Windsor not one individual who had ever been vaccinated died, and in Vancouver only one death occurred among such individuals—and this in a person who gave a history of vaccination thirty-six years previously, but had no scar. Striking individual demonstrations of the protection afforded by vaccination are provided in both epidemics. One example from each should suffice to convince anyone. In Windsor<sub>1</sub>:

"G. D., the man who had the original illness that was smallpox but was not diagnosed as such, had a daughter, Josephine, twelve years old. She was exposed to her father through the whole course of sickness and later on to her mother and aunt who developed smallpox *but she has not had one single day's illness herself*. Six years ago she was vaccinated to go to school and she has on her left arm a scar about the size of an old-fashioned Canadian five cent piece. Twenty-one close relatives of this little girl, all unvaccinated, are dead of smallpox."

In Vancouver seven members of one family contracted the disease and died. Three children who had been vaccinated did not show any evidence of the disease, even though intimately exposed to it in a most virulent form.

What is our position in Canada regarding vaccination? Quebec and New Brunswick have set a very high standard of achievement which is not attained in the other provinces. Who is responsible for vaccination and lack of vaccination—the physician, the public health authorities or the public? The objective, the hope of each of these is the same: the promotion of health, the postponement of death. With the menace of smallpox again emphasized by the Vancouver experience, with the knowledge that every unvaccinated community is still constantly exposed to that menace, and with the knowledge—so well proved by the Vancouver experience—that vaccination *does* protect, neither physician, nor public health official, nor the public can shirk the responsibility without being guilty of criminal negligence. Ignorance may be excused on the part of the public, but not on the part of the public health official or the physician. Apathy on the part of the public will generally be found to follow and be a result of apathy of the public health authority and the practising profession. Diffidence, on account of so-called medical ethics making it difficult for the physician to urge vaccination, should be attributed to lack of higher ethics. The reasonable, normal parent, and most parents are normal and reasonable, will use every means in his power to protect the life of his child. The medical profession is privileged to enjoy the utmost faith of the normal parent who will accept, practically without question, the advice which the physician may give. One must question whether any physician who fails to advise and urge vaccination, and thereby exposes those whom he is being trusted and paid to protect, is worthy of that trust.

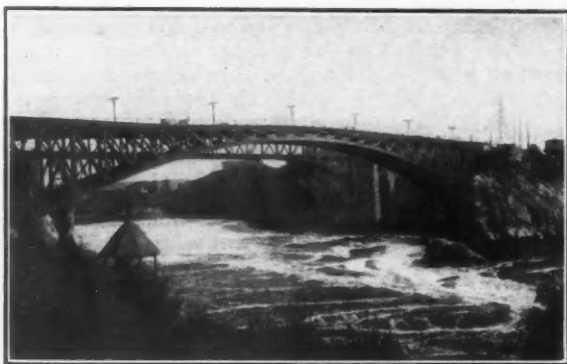
It is undoubtedly the bounden duty of the public health authority to make known to the physician the problem and the best methods of control. It is undoubtedly the duty of the profession to place that problem, all sides of it, before their patients. There should be no evasion of that responsibility. The public should be made acquainted with the menace of smallpox and with the advantages of modern vaccination, and they should know, too, that the risk attendant on vaccination is infinitely less than the risk of smallpox in the unvaccinated. With that information, the public must then accept the responsibility for accepting or rejecting vaccination. The public should also know that one vaccination does not necessarily confer a permanent immunity. Immunity is quantitative and relative. Revaccination in school life, if vaccination was performed in infancy, and again when any epidemic threatens, is a necessary part of the control of smallpox.

<sup>1</sup>F. Adams, *Canad. M.A.J.*, 14: 692 (Aug.), 1924.

## *Saint John and the Twenty-Second Annual Meeting*

**L**OCATED on the north shore of the Bay of Fundy, the city of Saint John stands upon a high peninsula, the harbor and river being in the centre of the city, and Courtenay Bay on the east side. The city has an area of twenty-one square miles, with a population of about 60,000. The harbor is known throughout the world, being absolutely ice free in winter and possessing, in addition to extensive docks, one of the largest and best equipped dry docks on the continent. More than ten million dollars has been

of New Brunswick's inland waterways, extends in its upper reaches from Edmundston past the capital city of Fredericton, widening out into a mighty flood a mile in breadth, and flowing into the Bay of Fundy at Saint John. One of the great beauty spots of eastern Canada is the Saint John River Valley. The Trans-Canada Highway No. 2 follows it closely, giving an almost continuous view of the river through its route of almost three hundred miles from Edmundston to Saint John. Outstanding among



THE FAMOUS REVERSING FALLS AT SAINT JOHN, N.B.

expended in the construction of additional wharves and sidings and the erection of a large grain elevator at West Saint John. The port is therefore one of the great nationally owned and operated ocean gateways of Canada.

Saint John is a manufacturing centre and a distributing point of strategic importance. In addition to excellent public schools it possesses a large, completely equipped vocational school with an enrolment of 1,755 students, and a new \$500,000 high school. The hotel accommodation is most satisfactory. The new Admiral Beatty Hotel, built by the citizens, affords all the advantages of the largest hotels.

The Saint John River, the largest

of the points of interest are the Reversing Falls of the Saint John River which flow upstream at high tide and downstream at low.

The larger meetings of the Canadian Public Health Association will be held in the new high school, which is conveniently situated to the Admiral Beatty Hotel, in which smaller meetings will probably be arranged. During the week of the convention, the staff of the new two million dollar General Hospital will provide a series of clinics in conjunction with the meetings of the Canadian Medical Association. An outline of the preliminary programme will be published in the April issue. The general meetings and the section meetings promise to be of unusual interest.

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## LABORATORY SECTION

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### *A Simple Method of Micro-pipette Isolation of Single Cells\**

ROY FRASER, M.A.

*Professor of Bacteriology, Mount Allison University,  
Sackville, New Brunswick*

**D**ESPITE the fact that single cell isolation is of great value, particularly in studies of bacterial variability and pleomorphism, and that clear descriptions of methods and uses have been given by Barber (1907-1914), Schouten (1911), Topley, Barnard, and Wilson (1921), Kahn (1922), Chambers (1922-1929), Wright and McCoy (1927), and others, we find nevertheless that many workers regard the technique as being too difficult to be really useful. The author of one well-known text-book refers to it as "tedious and difficult and except for some special purposes, not adapted to routine laboratory work."

The criticism is not valid. A study of the literature will show that the technique of single cell isolation is quite within the reach of most laboratory workers and is not unduly difficult or time-consuming.

Another criticism is that micromanipulators, such as those of Chambers, Péterfi, and Taylor, are complicated and expensive instruments, and that while they are useful for special research in some laboratories, they are not needed in the usual instrument equipment required for the work of the ordinary laboratory.

This criticism has some justification. It need not, however, stand in the way of single cell isolation being carried on successfully in a laboratory

which does not possess a micromanipulator.

The writer has devised an extremely simple method which makes the use of any special instrument unnecessary, and while it may lack the convenience and refinement of the micromanipulator, its usefulness lies in its simplicity and its accessibility to every worker at the shortest notice. In a laboratory where large numbers of micro-pipette isolations are to be carried on, a micromanipulator is desirable, but for occasional use the following method is quite adequate.

The method consists essentially of a combination of two microscopes, one of which uses its mechanical stage for the lateral control of the moist chamber, and the other provides an easy means of holding and maintaining vertical control of the micro-pipette.

The photographs submitted herewith will show the arrangement of the two microscopes, and are so self-explanatory that very little additional description is necessary.

Microscope *A* is for visual use and its mechanical stage controls the moist chamber, *C*. This microscope is mounted on any firm heavy base that will raise it about four centimetres, in order to accommodate the working level of the micro-pipette, *M*.

Microscope *B* is solely for the control of the micro-pipette. It is placed close beside *A* on the left side,

\*Presented at the 21st Annual Meeting, Canadian Public Health Association, Laboratory Section, Toronto, May, 1932.

as the pipette would prevent the operator's hand from manipulating the mechanical stage if *B* were on the right side of *A*. A smooth glass plate is placed under *B*, so that the microscope will slide very easily in any direction. This plate is important, as the operator's left hand must slide *B* very slightly in order to bring the pipette tip to its working location in the visual field. This may seem awkward at first, but a little practice will enable one to replace a pipette and bring the tip into the field in less than half a minute.

The pipette may be attached to *B* in either of two ways:

(1) The arrangement shown in Fig. 1 is by far the better way. *B* has a double nosepiece. To one objective—preferably of somewhat narrower diameter than the usual objectives—there is attached an ordinary two-way support clamp. Its gripping surface must be of the angular and not the curved type. The other end of the clamp projects beyond the nosepiece and furnishes a firm grip for the pipette. The pipette is held securely by the screw grip, and is very quickly adjusted, removed, or replaced. To change pipettes is the work of only a few seconds.

(2) The other method is less convenient, but will serve for an occasional isolation or two if the worker is in a hurry. The pipette is laid across the top of the nosepiece and fastened with two strips of adhesive, as shown in Fig. 2.

*Procedure:* A 45° angle pipette is placed in the clamp, the tip is brought to its approximate working position over the centre of the stage aperture, and the pipette shaft is gripped firmly by the screw. With the coarse adjustment of *B*, raise the tip until it is very close to the cover-glass of the moist chamber, and thereafter use the fine adjustment.

Using the 16 mm. objective of *A*, bring the tip into the field by sliding *B* gently on the glass plate. Centre

the tip carefully, and complete the centering under the 4 mm. objective.

When the series of micro-droplets (see illustration in Wright and McCoy) yield one containing a single microorganism, the 45° pipette is racked down with the coarse adjustment of *B*, the clamp screw is loosened, the pipette withdrawn from the chamber, and replaced by a 90° angle pipette, which is brought into working position as already described. Using the fine adjustment, the tip is brought slowly and carefully into the droplet, and the microorganism may be seen to enter the pipette. A suitable length of haemacytometer tubing has previously been attached to the pipette, as shown in Fig. 3, with a glass mouthpiece held near the ocular of *A* with an elastic band. Very gentle suction may be needed to make the microorganism enter the tip; it is often unnecessary. The pipette is lowered, removed from the chamber, and the droplet transferred to the culture medium, either by expulsion or by snapping off the tip with a sterile forceps and dropping it into the medium. Successful expulsion is favoured by having the capillary portion of the pipette filled with sterile broth for two or three centimetres of its length. The broth should be drawn up a short distance to leave the pipette tip empty.

While we have not made critical comparative tests, we feel that expulsion is the better method, and it may prove to give a higher percentage of successful cultures than the relatively low percentage reported in the literature. When the writer learned the Barber Pipette Method nineteen years ago, he was taught to expel the droplet by the use of broth as described above. Most of his failures have resulted from the broken tip method.

It is not necessary to include any description of the details of isolation work of this kind. It is assumed that those interested are already familiar with the original method of Barber (1) or some of the subsequent modifications thereof. The beginner will



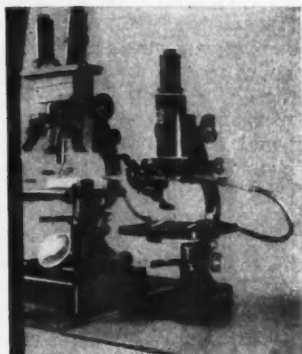


FIG. I

Micro-pipette held by support clamp.

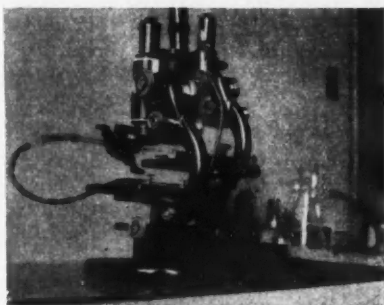


FIG. II

Haemacytometer tubing and mouth-piece, for aspiration or expulsion of droplets. Gives more delicate control than bulb, and leaves both hands free.

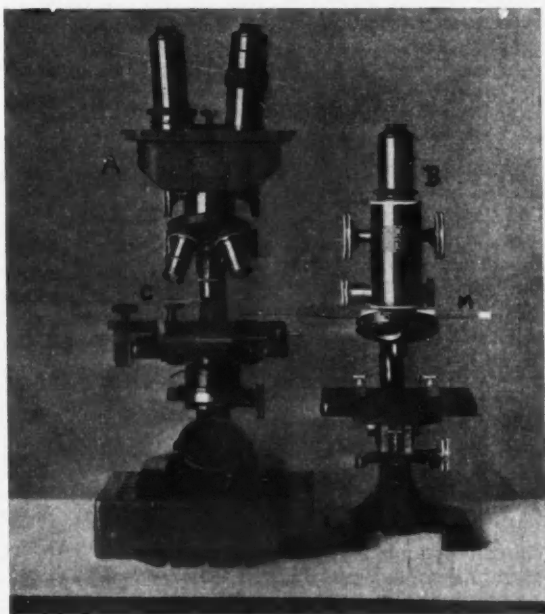


FIG. III

Microscope (A) for visual use and lateral control of moist chamber (C). Microscope (B) for holding and vertical control of micro-pipette (M), which in this case is fastened with adhesive.



find the methods described by Chambers(2) and Wright and McCoy(3) particularly useful. Some precautionary notes, however, may help to prevent difficulties common to all micro-pipette methods.

#### *Precautionary Notes:*

1. Vibration is a major difficulty and must be guarded against in every way possible. A rigid wall-table with iron pipe-leg supports will give the best results. Avoid leaning against the table, or any unnecessary touching or pressure on the apparatus. See that all connections are firm and secure. Keep the capillary shaft of the pipette as short as is consistent with suitable working length. Avoid very long or extremely slender capillaries; they are too sensitive to vibration.

2. The capillary must be straight and free from curvature, or it will be difficult to control accurately.

3. A capillary that is too thick will not be suitable for the production of the extremely small tip-diameter necessary.

4. The micro-flame must be reduced to a mere bead, and in bending the tip (the most difficult stage in pipette-making) the tip should be held at the side of the flame and slightly below it, the heat being applied to the thicker junction of the tip and the capillary, the hair-like tip being pointed away from the flame.

5. The glass plate under *B* in the writer's method must be heavy, absolutely smooth, and free from any irregularities.

6. It is not even necessary to purchase one of the regular micro-manipulator moist chambers. A satisfactory chamber can be made in a few minutes by cutting micro slides to the desired dimensions with a diamond and fastening them together with any quick-drying moisture-resisting cement. The degree of evaporation in the chamber is easily regulated by moving the micro lamp to the distance where its heat will produce a very gentle warmth in the chamber.

7. Small coverglasses are inconvenient for several reasons. We find a  $22 \times 50$  coverglass most satisfactory, as it provides space for several series of droplets.

8. Very small tips generally give the best size and shape of droplets. The droplet should be as convex as possible. Wide flat droplets are to be avoided. We agree with Wright and McCoy that it is not necessary to grease the coverglass to prevent confluence of droplets. There may be conditions, however, which will render a faint trace of sterile vaseline useful.

9. If isolations are being made from a very dense broth culture, it may be desirable to make a 1-10 or 1-20 dilution from which to distribute droplets, thus facilitating the finding of a droplet containing a single microorganism.

10. It may be advantageous, but is not strictly necessary, to use  $45^\circ$  angle pipettes for distributing the droplets. We have often had just as good results from the  $90^\circ$  angle type.

11. Single isolations are often a waste of time. Make at least four isolations in every case. The percentage of successful cultures of many bacteria is rarely better than 50% and often as low as 25%.

12. The most important requisites for success in this work are patience and manual delicacy, but a reasonable amount of introductory practice should make single cell isolation a practicable and useful procedure in any laboratory.

#### REFERENCES

- (1) Barber, M. A. Bull. Kansas Univ., 4: 3, 1907.  
Barber, M. A. J. Infect. Dis., 5: 380, 1908.  
Barber, M. A. Phillippine J. Sci., 9: 307-358, 1914.
- (2) Chambers, R. J. Bact., 8: 1, 1922.  
Chambers, R. J. Infect. Dis., 31: 334, 1922.  
Chambers, R. 1929, McClung: Handbook of Microscopical Technique, Part Two, pp. 39-73.
- (3) Wright, W. H. and McCoy, E. F. J. Lab. Clin. Med., 12: 3, 1927.

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## PUBLIC HEALTH NURSING

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### *Publicity in a National Visiting Organization*

DOROTHY M. PERCY

*Victorian Order of Nurses for Canada*

FOLLOWING upon the thoughtful and comprehensive paper on health education publicity written by Miss Anna Wells of the Manitoba Department of Health and Public Welfare, and appearing in the September number of the JOURNAL, further amplification of the subject in these pages may seem superfluous. There are, however, certain aspects of publicity as a whole which, when considered from the point of vantage of a national organization, may well constitute the starting point for a few generalities.

In the first place our problem is *different*. That is to say, the Victorian Order is concerned primarily, not so much with publicity methods in health education as with the best means for making thoroughly known to the Canadian people the amount and quality of nursing service available to them through this organization. Needless to say, such a programme calls for a technique differing slightly from that employed when publicity for health education is the main objective. The fundamental principles so admirably set forth by Miss Wells are, however, the same.

In 1927, when the need for a wider and more intensified dissemination of information regarding the Victorian Order was keenly realized, a worker was appointed temporarily to the staff

of the National Office to develop something along these lines.

Looking back over five years of effort one realizes that progress has been slow. There was, at first, the inexperience and diffidence of the worker. Secondly there was the fact that this particular field was untilled and that such accomplishments as were possible had to be in the nature of experiments. Then too, the amount of money which an organization such as the Victorian Order can allocate yearly to the development of publicity on its own behalf is not large. In addition, it was necessary to overcome a certain amount of prejudice incidental to misunderstanding of the term "publicity". There was the feeling, natural enough, that Victorian Order work was to a large extent self-explanatory, that it spoke for itself, requiring thereby no special publicity to reinforce its message. It became necessary to demonstrate how little, in reality, was known about our organization throughout Canada; that even if it did "speak for itself" such speech required interpretation.

Development of a programme has been, in the main, along two lines:

- (1) Publicity on behalf of the national body.
- (2) Assistance to branches in developing publicity locally.

Under the first heading may be placed the preparation and distribution

of booklets, pamphlets, News Letters, blotters and posters. Newspaper publicity appears here, too, and in this connection tribute is gladly paid to the president of the organization, the Right Honourable George P. Graham, whose long and close association with the newspaper world has made his encouragement, advice and suggestions peculiarly timely and practical.

From time to time material has been prepared and sent out to the leading newspapers in Canada and also to a western firm handling "ready print". The results of these ventures, judged by returns from a press clipping agency, have proved very satisfactory indeed.

Due to the interest of several free lance writers, one or two articles on the Victorian Order, written in popular vein, have appeared in well-known Canadian magazines. This phase of publicity is undoubtedly of considerable value and might be more widely utilized with advantage.

During the past five years the Victorian Order has taken advantage of numerous professional and lay conventions, and of the Canadian National and other exhibitions, to be represented by an exhibit. But more of exhibits later.

The second division, that of service to the branches in the matter of helping them develop local publicity, is less spectacular but represents, perhaps, the sounder aspect of our programme. It is felt that if we can build up in our branches a sense of the need for continuous interpretation of their work to a contributing public, our real aim will have been in no small degree achieved.

It may be said without fear of

serious contradiction that five years ago there was on the part of our branches no particular consciousness of this need. Now scarcely a day passes but one or more of our eighty-one branches write in for help with some problem of local publicity. In some of the branches publicity is planned for definitely throughout the year; in others, efforts in this direction are more or less hit-and-miss affairs. Nevertheless, the important thing is that the branches are commencing to recognize their need of continuous, carefully planned publicity as a distinct aid in the interpretation of their service.

Requests for help from the branches include suggestions for publicity during conduct of campaigns for funds, preparation of attractive annual reports, suggestions for year-round programmes of publicity, help with window exhibits, and preparation of special newspaper publicity.

With regard to exhibits, as with, indeed, almost all other forms of publicity, one's ideas and convictions pass through a transition period. After experimentation lasting over several years we have come to the conclusion that large, expensive single exhibits are out of place in a programme where expenses must be kept to the minimum compatible with effectiveness. On both counts large, cumbersome exhibits lose out. Expensive in transportation charges and in upkeep, and presenting difficulties in maintenance of freshness, these large exhibits require scrapping long before their initial cost indicates that their usefulness should be at an end.

For us, the problem of supplying our branches with light, practical

easily set-up exhibits has been to a large extent solved by having prepared a fairly large number of identical exhibits capable of being packed flat in corrugated paper containers, and shipped at moderate cost from place to place.

There are, of course, many problems and disappointments associated with any effort to develop a programme of publicity. There are, as well, satisfactions and rewards. Moreover, dull moments are at a premium because the work is so varied, each problem presenting a slightly different aspect of the situation, and requiring

for solution modified methods of approach.

The Victorian Order of Nurses for Canada is convinced that carefully planned, thoughtful publicity can be a distinct aid in the task of interpretation. Between this conviction, however, and its realization, there exists a wide disparity. Nevertheless, with, on the one hand, a clear view of our limitations, and, on the other, some conception of the possibilities of a really adequate programme, it should not be too difficult to move steadily, if slowly, toward our goal.

#### REPORTED CASES OF CERTAIN COMMUNICABLE DISEASES IN CANADA\*

TOTAL FOR THE TWO WEEKS† ENDING FEBRUARY 4 AND 11, 1933

Diseases	P.E.I.	Nova Scotia	New Brunswick	Quebec	Ontario	Mani- toba	Saskat- chewan	Alberta	British Columbia
Diphtheria.....	—	4	7	55	31	12	5	6	4
Scarlet Fever...	—	8	8	164	147	30	61	6	19
Measles.....	—	53	11	190	970	1	4	22	153
Whooping Cough.....	—	—	1	327	226	57	76	5	44
German Measles	—	—	—	8	1	—	—	—	1
Mumps.....	—	—	—	76	333	43	1	—	27
Smallpox.....	—	—	—	—	—	—	24	—	—
Cerebrospinal Meningitis...	—	—	—	1	4	—	2	2	2
Anterior Poliomyelitis.	—	—	—	3	—	—	—	—	—
Typhoid Fever...	—	—	—	48	6	15	2	—	4
Trachoma.....	—	—	—	—	5	—	3	—	11

\*Data furnished by the Dominion Bureau of Statistics, Ottawa.

†In Nova Scotia the week ends Wednesday; in Manitoba, on Friday; in all the other provinces, on Saturday.

## BOOKS AND REPORTS

### **A Synopsis of Public Health.**

By E. W. Caryl Thomas, M.D., B.Sc. (Lond.), D.P.H., Barrister-at-Law, Medical Officer of Health, Dagenham, England. Published by the Macmillans in Canada at St. Martin's House, Toronto, 1932. 646 pages. Price, \$6.25.

"This book is intended for the use of students working for their Diploma of Public Health or their Degree in State Medicine or Sanitary Science. It is a companion volume to the other members of the publishers' Synopsis Series."

The author has undertaken a colossal task in attempting to bring in one reasonably sized volume of six hundred and forty-six pages not only the essential facts of more than fifty communicable diseases, of the problems of occupation in relation to disease, of maternity and child welfare, of school medical services, of climate and meteorology, air and ventilation, of sanitation in all its aspects, of food control, of vital statistics and eugenics, but in addition a vast amount of detailed information. Sanitary law and administrative procedure pertinent to the particular topic under discussion are given in full.

The book is an achievement in typography. Each page, although set in relatively small type, is easily read because of the excellent spacing and the use of headings and subheadings. The proof reading has been meticulously done. The index is comprehensive, giving ready access to this veritable storehouse of public health data. Although prepared for use in Great Britain, the volume will be of value to students of public health in every land.

R. D. D.

### **An Introduction to Hygiene.** By W.

Robertson, M.D., D.P.H., F.R.C.P. (E). Published by the Macmillans in Canada, 1932. 207 pages. Price \$2.00.

A small book (207 pages) in which the author publishes the lecture notes of a course given by him at the School of Medicine of the Royal Colleges, Edinburgh.

### **Filterable Virus Disease in Man.**

By Joseph Fine, M.D. Published by the Macmillans in Canada, 1932. 144 pages. Price \$2.00.

Medical students and others preparing for examination in Great Britain have always had at their disposal compendiums and synopses of practically every subject. Dr. Fine has had in mind primarily the need of the student in preparing this synopsis of certain of the more important filterable virus diseases. He has offered a very useful classification which will be appreciated by the student. The practitioner of medicine, too, will be pleased with this little volume, as it gives a very satisfactory review of our present knowledge of these diseases. Within its scope and for its purpose, the book can be thoroughly recommended. R. D. D.

### **The Diagnosis and Treatment of Postural Defects.** By Winthrop

Morgan Phelps, M.D., Professor of Orthopedic Surgery, Yale University, and Robert J. H. Kiphuth, Assistant Professor of Physical Education, Yale University. Published by Charles C. Thomas, 220 East Monroe Street, Springfield, Illinois, 1933. 180 pages. 107 illustrations. Price, \$4.00.

Directed physical activities has been an established practice, particularly among older children and young adults, for many years. Cradled in empiricism, the movement grew until it had integrated the curricular programmes of primary and secondary schools and colleges in every country. Two of its major objectives were the prevention and correction of postural defects.

The programme advocated was based on formal exercises, organized play, then corrective gymnastics, until gradually the field of orthopedics was invaded. The interest manifested demanded direction along lines based on intimate knowledge of body mechanics and anatomy and the normal and abnormal reaction to essential physical effort. The advent of the school medical officer and the periodic health examination emphasized this need. This need is tersely and graphically met by the authors in their new text on "The Diagnosis and Treatment of Postural Defects."

Comprehensive, well illustrated and scientifically sound in its premises and observations, this book will satisfy a long felt want among all those who presume an interest in the maintain-

ance of health either among children or adults.  
J. T. P.

**The History of Dermatology.** By William Allen Pusey, M.D., LL.D., Professor of Dermatology, University of Illinois. Published by Charles C. Thomas, Springfield, Illinois, 1933. 233 pages. Price, \$3.00.

One method of studying the history of medicine is by taking up its separate branches and tracing the history of their growth. This naturally has advantages for those interested in special lines.

The present volume covers a field in medical history which has not been overworked, and should prove a very valuable addition to the library of all dermatologists interested in the history of their own specialty.

Its well written chapters include Ancient, Graeco-Roman, Medieval and Modern Dermatology, following with separate chapters on clinical, laboratory and modern methods in Continental Europe, Great Britain and in the United States. There is also an historical index of dermatology.

This attractive volume is well printed, and has thirty-five illustrations, mostly portraits.  
G. D. P.

## BOOKS RECEIVED

*An Introduction to Social Science for Health Visitors.* By Evelyn Wilkins, B.A. (Lond.), head of the Department of Hygiene and Public Health at the Battersea Polytechnic, London. Published by the Macmillan's in Canada at St. Martin's House, Toronto, 1932. 128 pages. Price \$1.20.

*Streptococci in Relation to Man in Health and Disease.* By Anna W. Williams, M.D., and Wm. H. Park, M.D., Bureau of Laboratories, Department of Health, City of New York. Published by the Williams & Wilkins Company, Baltimore, 1932. 260 pages. Price \$5.00.

*Food in Health and Disease—Preparation, Physiological Action and Therapeutic Value.* By Katherine Mitchell Thoma, B.A., director of dietetics, Michael Reese Hospital, Chicago. Published by the F. A. Davis Company, Philadelphia, 1933. 370 pages. Price \$2.75.

*Report of the State Department of Health, Connecticut, 1931.* 518 pages.

*Report of the Health Department, City of Winnipeg, 1931.* 150 pages.

*Annual Report of the Rockefeller Foundation, 1931.* 420 pages.



## CURRENT HEALTH LITERATURE

*These brief abstracts are intended to direct attention to some articles in various journals which have been published during the preceding month. The Secretary of the Editorial Board is pleased to mail any of the journals referred to so that the abstracted article may be read in its entirety. No charge is made for this service. Prompt return (after three days) is requested in order that the journals may be available to other readers.*

### **Incidence and Correlation with Clinical Severity of Types of Diphtheria Bacillus**

In a previous paper the authors drew attention to a correspondence between the clinical severity of cases of diphtheria and the cultural and biochemical characters of the bacilli isolated from them. Two distinct types of bacilli were described—*gravis* and *mitis* types—as well as infrequent intermediate forms. The present paper deals with a much more extended survey of cases and replies to criticisms which have been raised by others. Observations on 505 cases of diphtheria in the Leeds area have been made. Cases associated with the *gravis* type have proved most severe. The *gravis* type was associated with 380 cases, 78 of which showed paralysis; the *mitis* type with 102 cases, only two of which showed paralysis. Examination of strains from consecutive cases in other areas shows a very varied relative incidence. During the past two years it has been observed that cases of *mitis* infection have been readily controlled by serum, while cases of *gravis* infection have not, but attempts to demonstrate a convincing difference between the types by animal experiment have failed. This discrepancy is discussed and the authors express the opinion that "it would therefore seem doubtful whether the results of experimental serum therapy and prophylaxis in animals can be safely assumed to apply unreservedly to man."

Anderson, J.S., Cooper, K.E., Happold, F.C., and McLeod, J. W., *J. Path. & Bact.*, 36: 169 (Jan.), 1933.

### **Whooping Cough: A Study in Immunization**

During the past four years about 300 non-immune children have received a series of injections with a relatively fresh pertussis vaccine, made from a number of recently isolated, smooth, strongly haemolytic strains. Local reactions were transient and no untoward symptoms occurred. There were eight certain exposures (cohabitational or household) of the vaccinated children and 127 probable exposures without any child contracting whooping cough.

Sauer, Louis, *J.A.M.A.*, 100: 239 (Jan. 28), 1933.

### **Relation of Physical Characteristics to Susceptibility to Anterior Poliomyelitis**

This anthroposcopic study was undertaken in view of varied opinions as to the possible relationship between susceptibility to poliomyelitis and physical characteristics. Fifty-two children paralyzed by poliomyelitis during the New York epidemic of 1931 and a similar number of controls, matched as to

racial group, were examined. No evidence was obtained of a relationship between susceptibility and physical characteristics.

Levine, M. I., Neal, J. B., and Park, Wm. H., *J.A.M.A.*, 100: 160 (Jan. 21), 1933.

### **Atypical Forms of Encephalitis**

Early cases of encephalitis lethargica are not now seen, in this country at least, but quite numerous examples of encephalitis of known and unknown etiology present themselves. In this paper a series of six cases of encephalitis are described, three of which ended fatally. Four were of unknown etiology, while two, one of which recovered, occurred after vaccination.

Gordon, A. H., *Canad. M.A.J.*, 28: 8 (Jan.), 1933.

### **Accidental Sodium Fluoride Poisoning**

The toxic properties of sodium fluoride, which is widely used as an insecticide and is a constituent of most "roach powders", are, perhaps, not generally appreciated. Eight cases admitted during one month to one hospital in Dayton, are described. One case, which terminated fatally, was due to the accidental substitution of sodium fluoride for epsom salts. The other cases, which recovered, resulted from the substitution of this substance for baking powder.

Sharkey, T. P., and Simpson, W. M., *J.A.M.A.*, 100: 97 (Jan. 14), 1933.

### **The Production of Carbon Monoxide from Paint in Sealed Compartments**

It is shown that any composition such as paint containing linseed oil will in a confined space such as a sealed compartment of a ship, not only give rise to dangerous concentrations of carbon monoxide but will also, through absorption of oxygen during drying, produce an atmosphere seriously, and in some cases almost completely deficient in oxygen.

Dudley, S. F., Edmed, F. G., and Frederick, R. C., *J. Indust. Hyg.*, 15: 1 (Jan.), 1933.

### **Children of Schizophrenic Parents**

This paper deals with the results of an investigation into the mental and social status of 186 individuals, the children of schizophrenic parents who had been committed to hospital during the period 1915 to 1920. These individuals represented 75 families and 144 were above 15 years of age. Twenty per cent showed psychoses or other major forms of maladjustment, while a further 10 per cent showed minor maladjustment. Of the maladjusted, 65 per cent apparently owed their condition to endogenous factors.

Edna M. Lampron, *Ment. Hyg.*, 27: 82 (Jan.), 1933.



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